

# The Chemical Age

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**NOTICES:**—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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## Centralising Research

FOR the past two years a scheme with which nearly all those connected with both pure and applied chemistry are familiar has been developing for the centralisation of the country's resources in chemical knowledge. Matters, we are glad to note, are now moving more rapidly, and an appeal is shortly to be made for financial assistance both from chemical firms and private individuals who may appreciate—and there must be many of the latter both with and without the special spheres of the industry—the services rendered by the chemist during the war and the even more important role which he must necessarily play in building up and colligating the industries of the Empire. The sum required is half a million pounds, and this is to be devoted to the establishment of a "central house" in which it is proposed to accommodate all the principal chemical organisations, the nucleus being the Institute of Chemistry, the Chemical Society, and the S.C.I. The idea is to bring chemists of all types, both pure and applied, into closer communion, thus making the current problems more easy of solution at a very much reduced expenditure.

It is presumed, of course, that all those who come under the wing of the proposed organisation will still preserve their identity, but there will be a liaison between the separate units which will tend towards the elimination of duplicated efforts, and it will provide an opportunity for the developments of that *esprit de corps* which has been difficult of accomplishment in the past. At the moment there is, and perhaps rightly, a certain amount of rivalry between the premier chemical bodies, while the separate organisations all have to contend with minor differences of opinions arising within their own domestic circles. For the new central proposal to attain its objects it will, of course, be imperative for all concerned to sink their differences, and to unite with a will to make the scheme a success. Amongst other projects associated with the proposal are the provision of a really comprehensive library and the publication of literature in a more accessible form than it exists at present. We are glad to note that Dr. Stephen Miall is closely associated with the movement, which—so far as our own services are concerned—will receive any encouragement and notice we are able to provide.

## An Engineering View of the Chemist

IT is interesting to find that the involved nature of the problems which face the modern chemical engineer is beginning to be appreciated by the older professions of civil and mechanical engineering. Last week our contemporary, *The Engineer*, published a noteworthy article in which was discussed the entirely different attitude which was brought about by the war towards the chemical industry in general. It is encouraging to find the more staid and conservative branches of the engineering profession admitting that while the requirements of chemical engineering have much in common with engineering problems generally, they nearly always involve an additional factor which adds immensely to their difficulty. Thus, apart from the ever-present, but usually not excessively insistent question of corrosion by moist air or, at the worst, salt water, the structural engineer in the majority of his everyday operations has only to consider the weight and pressure, or at the most the abrasive actions of the materials with which he deals. Water, earth, rock or gravel, compressed air or steam, exert but little chemical action on the materials of engineering with which they come into contact, and the engineer's pre-occupation is mainly concerned with the strength of the materials he has to employ. The freedom of choice thus afforded considerably simplifies the whole matter; but the chemical engineer, owing to the restrictions imposed upon him by considerations of corrosion and resistance to chemical action, is faced with a very different problem. Upon the adequate

knowledge of the chemical behaviour of materials, therefore, success in chemical engineering must largely depend; and in a great many cases this very chemical consideration rules out many of the most useful materials which the engineer is accustomed to use in the construction of his plant. It is not too much to say, therefore, that progress in chemical engineering, and therefore in chemical industry, becomes largely a question of progress in the development of materials capable of resisting those forms of chemical attack which are most frequently encountered in the industry, and here there is room, not only for development of new materials and for new applications of existing ones, but also for a better knowledge of the properties of materials in this respect and for their standardisation from that point of view.

Our contemporary points to the fact that progress as regards chemically resistant materials may come about in a very striking manner is exemplified by the way in which the applications of the iron-carbon-chromium alloys known as "stainless steel" are at the present moment extending before our eyes. The sort of chemical action which occurs when an ordinary steel knife becomes tarnished after contact with, for instance, the juice of an acid fruit, is quite typical of a whole class of actions which have to be considered in chemical manufacturing appliances. If this particular problem can be solved so perfectly as has been done by "stainless steel," there should be good ground for the hope that it is not beyond the skill of the metallurgist to supply the chemical engineer with metals which meet his needs, even where these are somewhat stringent. Chromium steels themselves may prove useful in various directions, but one cannot hope that they will meet all the needs of the chemical engineer. Certain alloys of iron and silicon have also proved their utility, and the production of vessels and plant made of a metal which is, substantially, pure metallic silicon, has also been attempted with some success. Whether metallic chromium might not be found useful is, perhaps, a matter for actual trial, while such a metal as tantalum provides another possibility. It will be unreservedly agreed that one of the main difficulties which faces the chemist is that of transforming a laboratory discovery into an efficient large-scale process, and in such transfers the chief stumbling-block is that of replacing glass and porcelain with engineering materials capable of being obtained and used on a large scale.

### Discoloured Sulphate of Ammonia

SULPHATE of ammonia and its vagaries in the direction of colour and quality seem to have been monopolising attention of late. At one time it used to be said that some purchasers of the material really would not object if it consisted of about 50 per cent. of plaster of Paris, so long as it looked like what it was supposed to be. The insinuation may savour of hyperbole, but it certainly used to be a fact that quality, both physical and chemical, counted for little. Like so many others, however, the sulphate-of-ammonia consumer has progressed with the times. As an instance may be quoted the experience of one of our representatives who, while travelling recently in the Midlands, got into conversation with an obvious agriculturist, and was

particularly surprised to find him fully alive to the importance of nitrogen-content, and apparently well informed as to the high nitrogen fertilisers, such as synthetic urea, which the Badische concern is now turning out. An incident such as this serves to emphasise the importance of every sulphate of ammonia manufacturer attending to quality forthwith. In the past two weeks our pages have contained a good deal in connection with the question of producing a neutral salt; but, as outward appearance is even more likely to influence the average purchaser, we believe that the special article which appears elsewhere on discoloured sulphate will assist in keeping interest in so important a matter alive. The casual buyer still tends to judge of the value of sulphate of ammonia by its intensity of whiteness, so that greyish-white or slightly tinted salt is not now as readily disposed of as it used to be. A distinction must, however, be drawn between chemical colouration and physical discolouration. While the former is essentially due to the accidental formation of some definite chemical compound, such as ferric ferrocyanide or arsenious sulphide, the latter arises from the introduction of a foreign substance, such as dirt or tar which usually finds its way into the system with the ammoniacal liquor or, on the other hand, with the sulphuric acid. Chemical colouration, which in nine cases out of ten is of the blue description, may more often than not be traced to some lapse on the part of the attendant who neglects to watch carefully the gravity of the saturator liquid, and permits the bath to become "over-neutralised." It is in this direction that the process would seem to require some more effective check than is available at present. For instance, a long-felt want would be provided by the introduction of a continuously recording gravity meter, which would provide the management with a record of the watchfulness which the attendant had displayed in regulating his acid flow to meet the continuous and unavoidable fluctuations in the ammonia flow. Up to the present we have come across no device of the kind, but our readers have frequently enquired if anything of this nature is available. If it is, we shall, needless to say, be glad to have particulars of it for publication.

It is interesting to note that in connection with deposited physical impurities—a branch of the question with which the contributor of the article in this issue does not deal—Dr. Lessing has found that the foreign particles adhering to the salt crystals may be removed by agitating the latter with a clear saturated solution of sulphate of ammonia containing some free acid. This treatment causes the impurities to detach themselves so that they remain in suspension in the solution, being floated off by an upward current of the same solution the velocity of which is regulated. The important point is that the washing solution must be maintained in the acid state, for if it is permitted to become neutral or alkaline, some of the impurities are dissolved, and they will afterwards be thrown down on to the salt crystals. The white sulphate of ammonia thus produced is submitted finally to neutralisation by one of the now recognised means. The strides with which the technical manufacture of sulphate of ammonia is progressing must be beginning to astonish those who still persist in joggling along with the old haphazard methods of pre-war days.

### Modern Metallurgical Investigation

A PAPER which Dr. F. J. Brislee recently read in Manchester serves to illustrate the remarkable developments which have occurred in the building up of a new science of alloys and intermetallic compounds. The whole of the resources of science have been applied to the investigation of metals individually, and in admixture or combination with each other in alloys. Two metals are capable of forming an infinite number of alloys, although it is necessary to investigate only a comparatively small number of the possible combinations. As an example of the comprehensive manner in which research on a series of binary alloys is followed out, the following scheme of work is particularly instructive: The melting points (1) of the two constituent metals are determined, then (2) the melting points of mixtures of the two metals, the composition being accurately determined by analysis. From these data (3) the melting point curve, the first step to be equilibrium diagram, can be drawn. The micro-structure (4) of the pure metals and the alloys, in the cast and underworked and heat-treated conditions, is determined and photographed. In this way changes in structure and in properties which take place in the solid can be followed. The change (5) in mechanical properties of the metals and alloys with casting, working, heat-treating, such as tensile strength, resistance to impact, hardness, is then determined, and the micro-structure is correlated with these changes. The equilibrium diagram (6) can then be drawn from (2), (3) and (4), and furnishes a most valuable guide to the subsequent use of the alloys. Further (7) investigation of corrosion, electrical properties, density and other physical properties are also made, and, as far as possible, correlated with the above data.

In this way a complete examination is made of the physical and chemical properties of the metals involved, and from such an investigation it is possible to draw accurate conclusions of their behaviour under temperature and stress. Dr. Brislee pointed out that the behaviour of metals at elevated temperatures and at extremely low temperatures shows many anomalies, and often a reversal of their well-known characteristics. For example, lead becomes sonorous like bell metal when at the temperature of liquid air, whereas it has no "ring" at ordinary temperatures.

### Emergency Use of Oxygen

In the majority of the larger chemical and industrial works it is customary to keep at hand in the first-aid station a supply of medicinal oxygen for treatment in severe cases of gassing and for use when men are overcome by escaping fumes. Accidents of the kind are bound to happen occasionally; and, while many undertakings encourage their men to study first-aid work, there is no question that the emergency treatment available is not always as skilful as it might be. There is, for instance, a right and a wrong method of administering oxygen, and it is as well that those who resort to its use in cases of accident should be thoroughly acquainted with its effect on respiration.

Dr. R. D. Rudolf recently read a Paper before the Academy of Medicine in Toronto, in which he pointed out that the commonest way of giving oxygen is to hold a funnel connected with the cylinder near to the face of the patient. This is a most unsatisfactory method, for with a patient already short of breath, the mere holding of a funnel close to his mouth gives him a sensation of smothering. A much better method is to pass the oxygen through a soft rubber tube inserted into one nostril, while the attendant rhythmically closes the other nostril during each inspiration. It has repeatedly been urged that oxygen may act as an irritant to the respiratory passages, but it is now established that there need be no fear in this direction providing inhalations are restricted to a duration of ten or fifteen minutes at a time. Dr. Rudolf points out that by using the funnel method it is not possible to raise the proportion of oxygen in the inhaled air by more than 2 per cent., so that from the patient's standpoint the benefits are practically nil. In conclusion, it is imperative to bear in mind that the administration of oxygen should not be delayed and only used as a last resource as it so frequently is. It should be employed as soon as possible, before the vital tissues have been damaged by the want of it.

### Christmas Holidays

THE Offices of the CHEMICAL AGE will be closed from Thursday evening, December 23rd, until the following Tuesday morning.

### The Calendar

Dec.		
20	Royal Society of Arts: "Micro-Organisms and some of their Industrial Uses" (Cantor Lecture), by A. Chaston Chapman. 8 p.m.	John Street, Adelphi, London.
21	Royal Photographic Society of Great Britain: "Further Developments in Systematic Exposure in Photomicrography," by Duncan J. Reid. 7 p.m.	35, Russell Square, London.
21	Hull Chemical and Engineering Society: "Is a University-trained man a Commercial Asset?" <i>Debaters</i> , H. Thompson, W. Geary. 7.30 p.m.	The Metropole, West Street, Hull.
21	Society of Chemical Industry (Glasgow Section).	Glasgow.
23	Society of Dyers and Colourists (West Riding Section). M. Fort, M.Sc., F.I.C.	Yorkshire.
29	Society of Chemical Industry (Nottingham Section). 7 p.m.	Nottingham.
Jan.		
3	Society of Chemical Industry (London Section). 8 p.m.	Burlington House, Piccadilly, London.
4	Hull Chemical and Engineering Society: "Bye-ways of Municipal Engineering," by F. W. Bricknell. 7.30 p.m.	Victoria Room, The Metropole, West Street, Hull.
7	Society of Chemical Industry (Manchester Section): "An Industrial Research Association," by Arthur W. Crossley. 7 p.m.	Grand Hotel, Manchester.
8	Institution of British Foundrymen. (Lancashire Branch): Annual Dinner.	Manchester.



# The Discoloration of Sulphate of Ammonia

## Cause and Remedy

*The writer of the following article has had some considerable experience with the manufacture of sulphate of ammonia on a large scale. It will be generally agreed that the consumer to-day is fully alive to the advantages of a high-grade salt of good appearance, and that if the threatened competition is to be successfully met it will be more than ever necessary to attend to those points which have not been adequately studied in the past.*

It may be truthfully said that, prior to the outbreak of the late war, and before we had passed through that period of scientific purgation resulting from the exigencies of an unparalleled situation, the British producer of sulphate of ammonia gave no heed whatever to the chemical and physical characteristics of his product. He knew that, although the home consumer was a comparatively negligible quantity, the export market invariably absorbed the balance; and—beyond the test for nitrogen content—practically no questions were asked as to other chemical properties or general appearance. The middleman or shipper was largely responsible for this state of apathy, for it was his business to satisfy his customers, and, naturally, if no special requirements were asked of the manufacturer, he did not feel inclined to go to the extra trouble and expense of producing a high-grade product.

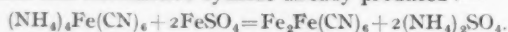
To-day the situation is undergoing a complete change. Neutral sulphate having high-quality physical properties is the order of the day, and the purchaser is far more influenced by mere colour than ever before. The periodical discoloration of sulphate of ammonia, which usually occurs in fitful bursts, without any very obvious reason, is now mainly confined to the small and medium-scale producers, who have not as yet seen their way to install the apparatus necessary for turning out a high-grade neutral salt. From samples which the writer has recently seen, it would appear that in many instances sulphate is still produced of varying shades of blue, yellow, orange, and pink, while the darkish-grey variety is almost just as much in evidence.

### Modern Theories

During some 10 years' experience of sulphate-of-ammonia manufacture, the writer has attempted to study the cause of this temporary coloration, he has examined the various theories which have been advanced, and has attempted to fit each of these in with actual working conditions. The most frequent defect is blue coloration, and although the actual causes of its appearance are not conclusively proved, there is little doubt that it is due to the ultimate formation of ferro-cyanides. The most frequent cause is neglect of the man in charge to watch the gravity of the saturator carefully and to adjust his acid flow by this. The result is that the bath is allowed to drop in strength and the liquid becomes alkaline. At the same time, the formation of the blue salt is indicative of a somewhat considerable drop in gravity; for this colour rarely makes an appearance when the Twaddell is above 54 deg. The usual sequence of events is that the regulation of the acid supply has not been attended to, with the result that the saturator becomes "over-neutralised." After a time, the attendant notices the conditions, and hurriedly turns on the acid at full bore, in order to bring back the strength to its normal figure. During the alkaline period, however, the iron salts in the acid were combining with the cyanide compounds (ammonium cyanide) in the liquor to form ammonium ferro-cyanide:—



If the saturator is cooler than usual, as in all probability it will be, the conditions are still more favourable to the blue salt, owing to more cyanide compounds being retained by the bath. When the extra flush of acid is turned on, the trouble is aggravated for the time, for the additional quantity of iron salts entering with the acid are sufficient for the formation of ferric ferro-cyanide (prussian blue) from the ferro-cyanide and ferrousferro-cyanide already produced:—



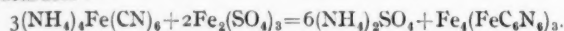
The ferrous salt is then oxidised to the ferric compound.

Opinions as to how the ferro-cyanide finds its way into the saturator are somewhat divergent. In the majority of cases, however, it would appear to be due to the stills "priming" over, and the most effective means of stopping this is to insert

a baffle box in the outlet pipe leading to the saturator. A common error, however, is that of returning the drippings from the box to the still; these should preferably be run back to the storage tank. A further explanation which has been put forward with regard to the cyanide reaching the still is that ammonium cyanide in the original liquor decomposes in the "free" still, and yields its hydrocyanic acid, which passes forward and unites with the iron sulphide present. It then forms a soluble ammonium ferro-cyanide.

### The Effect of Priming

It is common knowledge, of course, that ammonium cyanide cannot exist in a liquid which contains ammonium polysulphide, as the two combine to form ammonium sulphocyanide. It must be remembered that some liquors contain practically no ferro-cyanide, this being particularly the case with that produced from coke ovens; and yet such liquor is in no sense a guarantee against blue salt. Prussian blue, though usually formed in two stages, and making its appearance when the salt has been standing for some days, may also be formed in the saturator direct. This is due to excessive "priming" taking place and giving rise to alkalinity in the saturator:—



With regard to iron, as before stated, this usually finds its way to the saturator through the medium of the acid, but it may also originate with the corrosion of iron pipes used for conveying the gases, or be due to the erosion of the lead lining in cases where an iron shell is employed in the construction of the saturator.

The ultimate oxidation of the ferrous to the ferric ferro-cyanide is an occurrence which may give rise to some dissatisfaction among purchasers who are in the habit of taking a low-testing salt, this often meaning a salt that has come direct from the saturator and drying machine. The oxidising action has, accordingly, had insufficient time to develop, and the discoloration will ultimately occur after bagging-up. As this is most undesirable from both seller and purchaser's points of view, it will always be found advisable (when newly made salt is packed) to apply a rough test in order to determine its liability to discoloration. The most effective method is to add a few drops of hydrogen peroxide to the newly drawn sample, when the "blue" will immediately make its appearance if the objectionable ferrous salt is present.

Local alkalinity is probably the most frequent cause of saturator derangement, and it is particularly to be guarded against, as serious ammonia loss may result from it, in addition to the formation of blue salt.

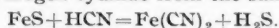
A. Thau\* has recently expressed his views upon the formation of blue sulphate of ammonia, and says that the blue salt is more frequently met with in distillation processes, and although the coloration does not actually decrease the value of the sulphate, the same price can never be obtained for it as for the whiter product. The recovery of ammonia by the direct process more or less overcomes the formation of highly-coloured cyanides in the saturator, but in the older processes it is a frequently observed phenomenon, and in some cases even usual.

Thau agrees that blue coloration is due to ferric-ferro-cyanide, which has an enormous "covering-power." He agrees in the main with the reactions given above, and assumes the existence of neutral zones in the saturator in which a precipitate of FeS comes down. Violent agitation or high acid content of the saturator should be all that is necessary to prevent the trouble in this case, but Thau states that even under these conditions, where local alkalinity is excluded, the blue salt may still be obtained, especially just after starting up.

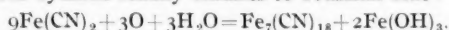
\* "Glückauf," August, 1919.



Thau considers the conditions which favour, and, on the other hand, prevent the formation of Prussian blue in the still. He suggests that in the upper part of the still and in the pipes the iron is coated with ferrous sulphide formed by the hydrogen sulphide from the ammonia liquor, and this reacts with the cyanogen, or hydrogen cyanide from the same source:—



Ferrous cyanide readily oxidises to Prussian blue:—



For the formation of FeS as above, a certain concentration of  $\text{H}_2\text{S}$  in the vapour is necessary. If this concentration can be reduced, the trouble will be avoided. This may be explained in several ways. It may depend upon the law of mass action; or an increase in the proportion of water vapour may lead to condensation on the walls of the pipes, and their consequent protection from the  $\text{H}_2\text{S}$ . It is possible also that a lower temperature helps the reaction, whilst a higher retards it, so that more steam, with its consequent higher temperature, will partly prevent the reaction.

Whether the oxidation of the ferrous cyanide takes place in the delivery pipe, in the saturator, or not until the salt reaches the store, the final effect is the same. In most cases the conditions in the delivery pipe are favourable to oxidation, although in others an apparently good grey or white salt gradually turns blue in the store.

#### Suggested Precautions

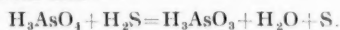
The following precautions to be taken in the working of the plant are suggested. When shutting down the still the flow of liquor should first be stopped, then after a while steam, so that the  $\text{H}_2\text{S}$  in the column may be completely driven over, and the formation of ferrous sulphide in the pipes and still be prevented. On the other hand, the still must be well steamed before starting the feed of liquor.

Coating the interior of the delivery pipe with lead has been tried to prevent the formation of Prussian blue, but the success is only partial, as the iron of the still head is still exposed to the vapours. Another means consists of a seal pipe at the end of the horizontal part of the delivery pipe, the condensate being led back to the still. In some cases in which the condensate contained Prussian blue already formed, this means was successful; but where the vapours past the seal contained sufficient  $\text{H}_2\text{S}$  to attack the iron in the vertical pipe of the saturator, Prussian blue was formed here.

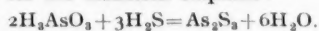
Preheating the ammonia liquor will raise the temperature in the still head, thus reducing the condensation of water vapour here to a minimum, and rendering the concentration of water vapour higher in the delivery pipe, thus reducing the formation of ferrous sulphide. The presence of hydrogen cyanide is not in itself of importance so long as the action of these on the iron is avoided.

#### Yellow Discoloration

With regard to yellow and brownish discoloration, this is invariably attributed to the presence of arsenic in the acid and the subsequent formation of arsenious sulphide, but the writer finds that these is a further distinct and frequent cause of the disorder, which will be discussed later. As far as the discoloration due to arsenic is concerned, its prevention is merely a matter of arranging for a supply of acid made from spent oxide rather than from pyrites; but in the event of the latter product only being available, care should be taken to ascertain that the acid has been de-arsenicated before delivery. The appearance of the arsenious sulphide in this case is due to the action of the sulphuretted hydrogen from the liquor stills on the arsenic, the sulphide, as a result, being precipitated from the acid in the saturator. As a matter of fact, the formation of the arsenious sulphide is in all probability brought about by two distinct reactions originating from the presence of arsenic acid in the sulphuric acid. In the first place, the arsenic acid in combination with sulphuretted hydrogen gives rise to arsenious acid:—

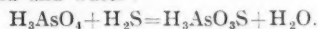


The arsenious acid then enters into combination with a further quantity of sulphuretted hydrogen, this reaction being responsible for the arsenious sulphide:—

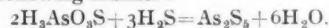


The second reaction (taking place simultaneously with the

above), and also accounting for the presence of the sulphide, probably occurs on the following lines: The arsenic acid again combines with sulphuretted hydrogen in the first place, but in this case the reaction results in the formation of sulphoxyarsenic acid and water:



The sulphoxyarsenic acid afterwards takes up more sulphuretted hydrogen, when the arsenic sulphide is thrown down in the following manner:



It should be noticed that in the latter series of reactions the resulting impurity is arsenic sulphide, whereas in the first-named series it is arsenious sulphide. There is, moreover, a further interesting distinction between the two, for whereas arsenic sulphide gives the more common orange tints, the arsenious sulphide accounts for the yellow variety. In many cases yellow discoloration, when due to sulphides of arsenic, may be effectively checked by admitting a small quantity of tar or heavy oil along with the acid. This then carried the sulphides (as they are precipitated) to the surface of the liquid—a scum is formed, and this has to be continuously skimmed off.

The idea is certainly useful so far as the open types of saturators (now only employed with small plants) are concerned, for there is then no reason whatever why a cheaper pyrites acid should not be used. But it is wholly impracticable with the modern type of "closed" saturator as no means exist for removing the scum, which would ultimately give rise to corrosion and stoppage.

#### Ferric Sulphate

It may be frequently noticed that when salt has been lying for some time in the drying bin exposed to the action of the air, it has a tendency to assume a yellowish tint in exactly the same manner in which a blue stain appears. This will be the case even though the sulphate as it left the saturator may have been perfectly white and in every way superior. The writer has found that the trouble is just as likely to occur when the acid is entirely free from arsenic, and it is apparently the outcome of the saturator having been allowed to run up in gravity above about 60° Twaddell. The result of this is that the sulphate contains an unusually high percentage of free acid, exceeding the normal amount of 0.4 per cent. In addition to this, the acid contains a certain amount of iron compounds (spent-oxide acid is often the chief offender, owing to the light dust travelling forward with the  $\text{SO}_2$  to the towers) which give rise to the formation of ferrous sulphate, a white and, therefore, undetected impurity—



When the salt is thrown out into the drying store the outer layers are affected by exposure to the air, with the result that oxidation of the ferrous salt takes place. This ferrous sulphate is thereby converted into ferric sulphate, which accounts for the yellow discoloration. The reaction is as follows:—



The appearance of this coloration (if known not to be due to the sulphides of arsenic) is a fairly certain indication that a consignment of acid containing a high percentage of iron has been received. The primary means of getting rid of the trouble is to insist on the chemical manufacturer supplying an acid with an iron content not exceeding 10 to 20 grains per gallon.

The tendency which any batch of sulphate may have to turn this colour after bagging up may be ascertained in a manner similar to that applied for blue coloration. A small quantity of the salt should be dissolved in water and a few drops of concentrated nitric acid added. If ferrous sulphate is present in undesirable quantities, it will be immediately oxidised and the solution will turn yellow:—

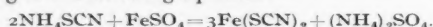


#### Pink and Red Discoloration

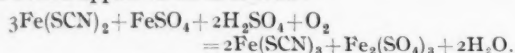
Red and pinkish discolorations of sulphate are fortunately of comparatively rare occurrence, and it may be, perhaps, said that this disorder is met with on those works which extract hydrocyanic acid from gas in the form of ammonia

sulphocyanide, and then work up the latter liquor into sulphate of ammonia and calcium sulphocyanide. In such cases, "priming" of the stills is apt to take place, when a certain quantity of the liquor (containing sulphocyanides) gets over into the saturator. These cyanides (in the form of ammonium sulphocyanide) then react with the iron sulphate—the latter being produced as described above—and give rise to ferrous thiocyanate. This last-named compound is, however, imperceptible, and is of somewhat similar character to the ferrous ferro-cyanide causing the blue stains, being white in appearance. When discharged into the store it is ultimately oxidised by the air into ferric thiocyanate, the latter having a characteristic red colour.

The chemical reactions accounting for the formation of these salts are somewhat complicated; but, so far as the writer is able to judge, the white thiocyanate is produced according to the following equation:—



The oxidation of the ferrous into the ferric thiocyanate would then appear to be as follows:—



#### Effect of "Direct" Recovery

Within recent years the "direct" plant for the recovery of sulphate of ammonia has been fairly generally adopted on many coke-oven works. It has been said that the pink coloration of the surface of the sulphate is peculiar to this process. T. B. Smith,\* dealing with the matter, advances two main suggestions to account for this coloration, namely, (1) phenolic bodies, and (2) cyanogen compounds. This authority points to the fact that three common constituents of coke-oven gas are: (1) water vapour, (2) ammonia, (3) carbon bisulphide. From these it is believed that ammonium sulphocyanide is formed in the following manner:— $6\text{NH}_3$ , ammonia;  $3\text{H}_2\text{O}$ , water;  $3\text{CS}_2$ , carbon bisulphide;  $2(\text{NH}_4)_2\text{CS}_3$ , ammonium thiocarbonate;  $(\text{NH}_4)_2\text{CO}_3$ , ammonium carbonate. The ammonium thiocarbonate then decomposes into sulphuretted hydrogen and ammonium sulphocyanide:  $(\text{NH}_4)_2\text{CS}_3$ , ammonium thiocarbonate;  $2\text{H}_2\text{S}$ , sulphuretted hydrogen;  $(\text{NH}_4)_2\text{S}(\text{CN})$ , ammonium sulphocyanide.

The ammonium sulphocyanide, on entering the saturator in the "direct" process, most probably before it is decomposed by the acid, forms a complicated compound with the iron, the latter being present as an impurity in the acid. An apparently white salt is obtained, but it colours quickly upon exposure to the air, due to the presence of slight traces of a blood-red ferric thiocyanate, the coloration of which, according to the ionic hypothesis, is due to the unionised molecule  $\text{Fe}(\text{CNS})_3$ , since neither the ferric ion nor the thiocyanate ion is coloured. The coloration is intensified if more ferric salt is added, the addition of a common ion causing part of the ionised salts to re-combine to form molecules of the coloured unionised ferric thiocyanate. This addition is caused by the gradual oxidation of the traces of ferrous sulphate always present in commercial ammonium sulphate. It is, therefore, obvious that the gradual intensification of the pink coloration is the immediate result of the gradual formation of ferric salts from the oxidation of the slight traces of ferrous sulphate.

#### Gas Masks

THE important part which Professor Percy Frankland, formerly Professor of Chemistry at the University of Birmingham (of which he was Science Dean), played during the war in the production of gas masks was told in Birmingham last week. In the early part of the war considerable difficulty was experienced in getting masks which were effective as a protection against the poisonous gases employed by the enemy. Professor Frankland was asked to give his assistance in the matter, and as a result of experiments carried out in the laboratories of the University and the experimental mine a highly effective type of gas mask was devised. This device was used in the later stages of the war, and it was recognized that it offered the soldiers an excellent form of safety from poisonous gases.

\* Coke Oven Managers' Association, December, 1918.

## Particles and Pigments

### Discussion at Oil and Colour Chemists' Association

AT the meeting of the Oil and Colour Chemists' Association on Thursday, December 9, Dr. C. A. Klein and Mr. W. Hulme described some preliminary work which they are carrying out in regard to the determination of the size of particles and the application of this to the paint industry. A fuller and more complete account of the work is promised for a future meeting.

Dr. R. S. MORRELL (President), who was in the chair, asked if Dr. Klein could give him a scientific explanation of the peculiar difference between the dry and the wet screen in the elutriator which had been devised by him and his co-author. The problems of settling, he said, seemed to be extraordinarily complicated, although they might appear simple at first sight. The author's method of recording the size of particles on the basis of the percentage of those particles in the mixture was much easier to follow than any curve method. He gathered that Dr. Klein's practice was to consider that the fine particles, when they got to a certain fineness, acted as lubricating agents, and, if he was right in that, he would like to know what was the connection between the size of the particle and its lubricating power. They would all look forward to the further contribution giving fuller details with the greatest interest, because what they had been told only just opened up the field, and he was quite sure that in the next communication they would get some very striking results.

Mr. R. P. L. BRITTEN said he had tried various ways in the past of determining the size of particles, but with indifferent success. He had experienced a great difficulty in obtaining elutriators, and if Dr. Klein could tell him where he could get one he would be extremely obliged.

Dr. KLEIN said it was impossible to get them at the present time.

Mr. BRITTEN said he was sorry to hear that they were in the same position now that they had been in for a long time in that respect. He would like to know how Dr. Klein standardised his jets, because that was of some considerable importance, and a matter in which he had experienced considerable difficulty with the elutriators that he himself had made. Did Dr. Klein think, on the question of fine grinding, that the proportion of fine pigment present had any effect?

Dr. Klein said he could give no reason at the present moment for the difference between the wet and the dry screen, and could only say that there was a difference. The edges of the mesh appeared to get foul, no matter how they were cleaned, and the effect was a very remarkable one. With regard to the President's question as to whether there was a definite limit to the size of the particles in relation to their lubricating properties, he thought this would depend upon the particular form of pigment. He had not found any difficulty in standardising jets, perhaps for the reason that the elutriators that he had were rather well constructed, the flat sides being really flat. Each of his jets were standardised, and the velocity was expressed in millimetres per second; but it took nearly £10 to standardise an elutriator, and that £10 was accounted for by labour costs alone. The best proof of accuracy of an elutriator was that the velocity curves were curves without any kinks in them at all. There was no difficulty in getting any sized particles required, provided the conditions were known.

#### Need for Research

Mr. W. J. PALMER said that this was a very difficult subject to follow; but, at the same time, it was a striking example of the need for research upon an industrial matter such as this. In the elutriators they had had before them for years past this question of the size of particles and the physical condition of pigments had been presented in a very disjointed and almost haphazard manner. One writer on the subject had his views and treated it in one way, whilst another writer treated it in quite a different manner. Dr. Klein had now tackled the problem in a purely scientific manner, and was proceeding stage by stage, but the whole thing was too difficult to assimilate in an evening. It was, nevertheless, satisfactory to know that Dr. Klein was continuing this work, and would come before the Association again with his later results as to the physical condition and size of particles. The importance of the subject had been very forcibly brought home to those members of the Association who were members of the Committee dealing with

certain specifications. Without exception, he believed all the specifications dealing with pigments started off in the first or second paragraph with words to the effect that the material must pass through a screen of so many meshes to the linear inch. That was all very nice to read in print, but practically it meant nothing. They had raised the subject with the authorities, and had suggested that more scientific methods should be introduced into the interpretation of these specifications; but, as usual in all such questions, it was difficult to get a definite answer from the authorities, and he believed the specification would go through with the provision that the pigments should pass a screen of 200 meshes to the linear inch, which, as he had said, might mean nothing. At the same time, it showed how important it was that some definite method of measuring the sizes of pigments, especially as applied to the paint and varnish trade, should be introduced, and he believed that Dr. Klein had taken the first step in a really definite direction. There was a point he would like to mention in regard to grinding in mills. The question of reducing any substance, be it pyrites, oxide or any mineral colour, to a definite fineness in a mill was rather an open one, and to a large extent it depended on the size of the mill and the quantity of the charge. If they took a mill as used in an ordinary works and put in 1 cwt. of material and ground it, they would find that in two minutes or so a certain percentage of the particles was of a certain degree of fineness. If they doubled the charge and put in 2 cwt. and ground that for double the time, they would probably find that the proportion of fine particles would not be the same percentage as in the previous case.

Dr. KLEIN said that each mill must have optimum conditions.

Mr. HOWLETT pointed out that Dr. Klein had dealt mainly with water in his experiments, and asked if he had found any connection between materials carried by water and those carried by other substances, such as alcohol. In one experiment which he had carried out very roughly in a great hurry, to convince directors from the scientific point of view, he took three definite quantities of pigment, one of which was mixed with a substitute, another with a similar quantity of linseed oil, and the third mixed with an equal quantity of the previous two substances, and found that not only did the rate of settling vary, but was actually reversed in some instances.

#### Question of Medium

Dr. KLEIN said he had carried out many experiments with alcohol, but was of the opinion that the question of the medium to be used should be determined by the conditions in each particular case. The gauging of materials might, according to circumstances, be done better by water, paraffin or alcohol. As regards water, there was the point that they must not regard it necessarily as being an inert material, and particularly London water. The amount of carbon dioxide in it was in some cases quite sufficient to cause chemical action which utterly ruined work of this description. The question of the material to be used was, after all, one which must be determined according to the particular wants. In future, however, he thought it would be necessary to investigate the question of viscosity. It was a thing he had had in mind, but had not found time to do yet. Important questions in this connection would probably arise with linseed oil and possibly linseed oil in mixture with thinners, but that problem he had rather reserved as part of the investigation of the settlement of pigments in paint, not in the can, but the separation in the paint film, which was a more difficult matter. He remembered one experiment some years ago with an actual paint film, carried out to see whether there was an irregular settlement. He took small pieces of wood and painted them with white lead barytes paint, which was made as uniform as possible, and when the paint was thick enough it was exposed to sulphuretted hydrogen, which had the effect of blackening the lead, and it was possible to see under the microscope that settlement had taken place, because the portion of the film close to the timber was very much whiter than the upper layer, which, one would naturally imagine, consisted of white lead, and was much more finely divided.

Dr. MORRELL asked Dr. Klein what was the smallest sized particle which he had come across? Was he getting down to fractions of  $\mu$  or not?

Dr. MORRELL said that in this matter they were bringing in surface forces of remarkable interest, and it might be found that there was a distinct connection between size and behaviour of the particles. Indeed, they were going to bring into play forces the nature of which was appalling, and it was a most interesting field of research. Did Dr. Klein think there was any connection between the general adsorption properties of pigments and the conditions of grinding?

Dr. KLEIN said he thought there was a connection, but although he had carried out experiments, he was not sufficiently satisfied with the data to express a definite opinion.

Mr. H. A. CARWOOD (Hon. Secretary) asked Dr. Klein if he had any information as to what should be the smallest sized particle to which they should work in the paint trade, because he felt that beyond a certain degree of fineness their pigments would not be so satisfactory as they were just above that degree.

Dr. KLEIN said he was unable to express an opinion on that yet. It was only when he had gone into the matter that he realised how difficult the problem was, and the whole question of the size of the particles opened up an immense field. The importance of the question of the size of the particles of pigment, not only in oil, but in the dry condition, was coming more and more to the front, and he thought that any chemical action was largely dependent upon the surface presented. There was a general idea in certain quarters of the trade that, on the principle that if a thing was worth doing at all it was worth doing well, the pigment should be dried as completely as possible, but that was a huge mistake. There were cases in which extra fine grinding was a great mistake, because it prevented the interlocking which gave the necessary strength.

A hearty vote of thanks was accorded Dr. Klein and Mr. Hulme.

### Chemical Traders and the Bill

A MEETING was held on Wednesday of the Chemical and Dyestuff Traders' Association executive council, at the Commercial Sale Rooms, Mincing Lane. Mr. F. T. T. Reynolds, Chairman of the Association, presided.

The meeting was called to consider the position of the traders and distributors as affected by the Dyestuffs Bill now before Parliament. The chairman said there had been too great a tendency in the past, especially on the part of the manufacturers and the Government, to disparage the merchant. Which section of the community had made a claim to be represented on the Advisory Committee directly, the Advisory Committee being the body upon whose recommendation the Government would act with regard to the issuing of licenses. That claim, the chairman had reason to believe, was being seriously considered. At the present time many manufacturers, and especially the large combinations, and some of the Government-supported dyestuffs manufacturers, were stating that they were only prepared to sell to consumers direct; and they had arrangements for exportation and distribution. That was a direct challenge to the merchants, and as a policy it should be fought and defeated. A clause was needed in the bill which would prevent that sort of thing, and also prevent any possible monopoly.

Mr. John Brown suggested that manufacturers should not be allowed to import dyestuffs for distribution in this country.

A resolution, urging that the bill should be subject to revision at the end of three years, and that Government assistance should be given on a wider basis, was passed.

The Salters' Institute of Industrial Chemistry has awarded five fellowships for post-graduate study in the laboratories indicated: Mr. A. H. Adcock (Liverpool University), Mr. J. A. Gentle (Oxford), Mr. S. J. Saint (Reading), Mr. C. B. Taylor (Imperial College of Science and Technology), and Mr. Donald Turner (Sheffield). Scholarships have been awarded to Messrs. M. D. Forbes and G. M. Lowe (Imperial College of Science and Technology), A. W. Pritchard and F. W. Turner (East London College). Forty-five grants in aid have been awarded to chemical assistants, occupied in factories in or near London, to facilitate their further studies.



## The Society of Chemical Industry Manchester Section

THE third meeting of the session of the Manchester Section of the Society of Chemical Industry was held on Friday, December 3rd, at the Grand Hotel, Manchester, there being a large attendance. Mr. John Allan presided.

A paper by Dr. R. Robinson, F.R.S., and Mr. F. E. Gornall, on "Beta Trinitrotoluene and Certain Derivatives," was read by Dr. Robinson, who said that when crude trinitrotoluene, obtained by direct nitration of toluene in stages, was washed with cold alcohol, almost 10 per cent. of the material passed into solution and the residue obtained by evaporation of the solvent consisted mainly of the dinitrotoluenes, especially 2:4-dinitrotoluene and isomerides of 2:4:6-trinitrotoluene. At a time when these so-called alcohol residues were being produced on a considerable scale experiments were instituted with a view to discovering a possible use for the material, which was not only almost a waste product, but also a source of danger. The residues were a dark brown viscous mixture of oil and crystals, and preliminary experiments showed that the solid isolated from the mass was a complex mixture containing (a) trinitrotoluene, 2:3:4-trinitrotoluene (b), and 2:4:5-trinitrotoluene (y), as well as 2:4-dinitrotoluene. If, however, the crystallisation was carried out under certain specific but simple conditions, it was very easy to obtain a separation of a mixture of 2:4-dinitrotoluene and *b*-trinitrotoluene free from the *a* and *y* isomerides. The optimum temperature was found to be 18-20° and a sufficiently satisfactory process was to melt the mass and pour into clean enamelled iron vessels with glass covers adding 10 grams of crystals from a previous experiment. After about six to seven days the separated crystals, carefully washed from adhering oil, began to show signs of containing the *y* isomeride, for instance, by giving a blue colour on washing with sodium carbonate and alcohol. The solid was then collected in a centrifuge and nearly pure *b*-trinitrotoluene was readily obtained by washing with sulphuric acid. The mass was then mixed with three times its weight of concentrated sulphuric acid, heated to 100° with stirring, then cooled and filtered, the crystals being washed with a little more sulphuric acid and then with water, being finally dried in the air. The sulphuric acid mother liquor was shown to contain little beyond 2:4 dinitrotoluene, and this could be directly nitrated so as to obtain *a*-trinitrotoluene of good setting point.

Dr. Robinson cited a number of typical results obtained. The melting point of the crude substance being 108°.

The oil separated from the solid was extremely difficult to utilise in a satisfactory manner, but could probably be employed as a low grade explosive in suitable admixture or worked up for 2:4-dinitrotoluene by treatment with sodium sulphite in aqueous suspension. Investigation had been made in directions which might lead to the preparation of new intermediates for azo-dyestuffs and a series of azo-dyes had been prepared which coupled with diazo salts with the greatest facility. Respecting its influence on shade the new component resembled *b*-naphthol rather than the isomeric known toluenediamine sulphonic acids, and produced with tetrazotised toluidine a crimson dyestuff entirely different from Toluylene Orange R., but unfortunately the colour was a sensitive indicator, and the dyeing could not be developed by means of *p*-nitrobenzene diazonium chloride. The most promising series of azo-dyes were those obtained with dihydro thio *p*-toluidine, &c., and those of the Bismarck type.

A number of other experiments were also explained.

Messrs. Callan, Horner, Bentley, Stevenson and Drummond Paton took part in the discussion.

### The Thalleioquin Reaction

Mr. Wm. Beaumont Hart read a paper on "The Origin, Development and Value of the Thalleioquin Reaction." He stated that he began his investigations as to the analytical value of the Thalleioquin reaction in 1909 but did not at first meet with much success. The discovery of the reaction was ascribed by text-books, works of reference, &c., to J. J. André and to Brandes. The earliest published statement of the green colouration produced by the addition of chlorine water to a quinine solution, followed by ammonia, was made by H. A. Meeson, of Guy's Hospital, in the *Phil. Mag. and Jour. of Science*, 1835, p. 158, January 7th, and who stated that it was sensitive to 1:8750. André, Brandes and Pelletier further

investigated the reaction, and Brandes and Leber named the product Dalleiochin or Thalleioquin.

Mr. Hart then referred to the investigations of Vogel, Kletzinsky, Flückiger, Léger, Vendraseck, Le Wall, Trimble, Commanducci, Comstock and Koenigs, Durazewski and Dziurynski, Christensen and Battandier.

As far as was known the action of chlorine and bromine on quinine, in dilute aqueous acidified solution, appeared to be similar, and the products, beyond the dihalogen action stage, which could be formed during, or could give rise to, the thalleioquin reaction were evidently numerous. He (Mr. Hart) had approached the problem from an analytical standpoint, and it was satisfactory to find that his conclusion, arrived at in 1909, that six atoms of the halogen were required for the full reaction, was confirmed by the later results of Christensen. It was possible, and probable, that the progressive halogen reaction ran concurrently to some extent, *i.e.*, part of the halogen was preferably used in further conversion of the intermediate products formed from the quinine than in the full conversion of the quinine into intermediate products. This would explain why the thalleioquin reaction was obtained, though not to the full extent, by the action of much less than six atoms of bromine per quinine molecule. Christensen's statement that the intermediate product 5-chloro-6-hydroxycinchonine oxochloride gave the thalleioquin reaction by treatment with, an oxidising agent, a substance that combined with chlorine and explained the mechanism of the delay in the final green colour production by Vogel's reaction—by potassium ferrocyanide, chlorine and ammonia neutralisation—and also by Battandier's reaction—by copper sulphate, a carrier or catalytic agent for the halogen—since with these reagents there were the three essentials, time only being necessary. This observation also applied to some extent to Klitzinsky's reaction, in which ferri-cyanide replaced the ferro-cyanide of Vogel, though in this case it was probable that further change occurred.

The replacement of ammonia by other bases was made by Candussie, using chlorine and lysidine, with production of a yellow colour, and by Ganassini, using pyridin, with production of a yellow, rose, and, finally, a purplish-red colouration.

Mr. Hart further stated that during the early stages of the investigation the use of a solvent, such as amyl alcohol, &c., for dissolving out the green-coloured product suggested itself, but from the results obtained it was not considered to be of any advantage.

Messrs. Callan, Challenger, Robinson and Bloch took part in the discussion.

## Edinburgh and East of Scotland Section

THE third ordinary meeting of the Edinburgh and East of Scotland Section of the Society of Chemical Industry was held on Tuesday evening, December 7, in the hall of the Pharmaceutical Society, York Place, Edinburgh, Dr. D. S. Jordan, president, in the chair.

Mr. A. P. Laurie, B.Sc., Principal of the Heriot-Watt College, read a paper on "The Work of the Waste Products Committee," of which he was chairman during the war. The results obtained by the Committee showed that there was a distinct opening for a committee of this kind, whether conducted by an association of chemical trades or by Government. If conducted by the chemical trades alone it would have too narrow a reference, and it would be necessary to have members representing various other industries. In some ways it was peculiarly suitable for Government research, as they had at their command information from every branch of industry. The Committee based their investigations on the results of circulars in which the question was asked, "Have you any waste products not at present utilized or fully utilized to what you consider the best advantage?" The total number of waste products submitted to the Committee was about 70. It was only possible for them to begin investigations on a limited number. This large number, however, showed the need there was for inquiries of this kind.

### Waste Products

Among the more interesting of the waste products submitted were alizarin residue, waste ammonia liquor from blast furnace gases, bauxite residues, selenium residues, china clay residues, residues from oxide bichromate of soda, oxide of iron residues and scrap leather. The Committee made

preliminary investigations into a large number of these residues and issued reports to the trade and in certain cases were successful in solving the problem that was put forward, leaving the question of its commercial utilization to the trade. To take for instance one simple example, the sulphate of arsenic residues left from the purification of sulphuric acid. The Committee found that if the magna-sulphide of arsenic in sulphuric acid was raised to a temperature of 200°C. before dilution with water, the whole of the arsenic separated as a hard granular precipitate from which the sulphuric acid was easily syphoned off and the remaining residue washed and dried. To the best of the Committee's information very few sulphuric acid makers were aware of this simple method of treatment. They entered into correspondence with arsenic smelters who, after having had samples submitted, were willing to buy the arsenic residues in this form. Very elaborate research into the bauxite residues with a view to utilization for the purification of coal gases was not completely successful. At the time the Department was closed down they were just beginning to get some excellent results. At the same time they were able to show how to treat certain ether residues submitted to them which contained a high percentage of oxide of iron so as to enable them to be utilized for the purification of coal gas. They were also able to assist in organizing the utilization of waste liquors from the pickling of iron and elicited much useful information as to the residues in which selenium was present in large quantities of the conditions for extraction. They carried out fruitful inquiries into the bichromate of soda residues, acetic or hydrid residues, and many other substances. One interesting fact was revealed in the course of these inquiries—that was that very often while one firm was waiting to know how to deal with a particular residue other firms in the same trade already knew how to treat the residue, but kept the information to themselves. Of course, in all this matter of residues it was ultimately a purely commercial problem as to whether even though a method had been worked out from a scientific point of view it would pay to carry it out in practice.

#### Discussion

Mr. J. Rutherford Hill, Mr. Hilditch, Major Bruce, Mr. Baxter, Mr. Romanes, Mr. Williamson, Mr. Findlater and the chairman took part in the discussion, and Principal Laurie received a vote of thanks.

The question of forming a Scientific Club in Edinburgh was considered, and Mr. Luff gave in a report of a meeting of sub-committees of the Institute of Chemistry and the Society of Chemical Industry which had been appointed to obtain information on the question. They had arrived at the opinion that it would be difficult to carry out the idea of a purely Chemical Club as there were not sufficient chemists in the city to make it a financial success. It was estimated that there were only about 150 members resident within easy distance of Edinburgh. The question was not decided at that meeting.

#### The Royal Institution

The following are the lecture arrangements at the Royal Institution, before Easter: Professor J. Arthur Thomson, a course of lectures on the Haunts of Life, adapted to a juvenile auditory, to begin on December 30; Sir Gerald P. Lenox-Conyngham, two lectures on the Progress of Geodesy in India; Sir James G. Frazer, three lectures on Roman Life (Time of Pliny the Younger), London Life (Time of Addison), Rural English Life (Time of Cowper); Dr. Arthur Keith, four lectures on Darwin's Theory of Man's Origin; Dr. W. A. Herdman, three lectures on Oceanography; Mr. Frank Balfour Browne, two lectures on Mason Bees and Wasps; Dr. George C. Simpson, two lectures on the Meteorology of the Antarctic; Dr. Percy C. Buck, three lectures on the Madrigal, with musical illustrations by the English Singers; Professor A. Fowler, three lectures on Spectroscopy; and Sir Ernest Rutherford, three lectures on Electricity and Matter. The Friday evening meetings will commence on January 21, when Sir James Dewar will deliver a Discourse on "Cloudland Studies." Succeeding discourses will probably be given by Sir Frank Benson, Dr. A. D. Waller, Dr. F. W. Aston, Mr. Solomon J. Solomon, Dr. John Buchan, Sir Frederick Bridge and other gentlemen.

## Traders and the Dyestuffs Bill

### Manchester Conference of Chemical Merchants

THE first of a series of conferences convened by the Chemical and Dyestuffs Traders Association to consider the Dyestuffs Bill was held in the Mersey and Irwell Board Room, Manchester, on Thursday, December 9th. The large and representative attendance testified to the widespread interest in the subject, and most of the chemical and dyestuff trading firms in the Manchester area were represented. Mr. F. T. T. Reynolds (chairman of the Executive Council of the Association) was voted to the chair, and among those supporting him were Messrs. Walter Waugh, London (hon. treasurer), Charles Page, London, Thomas Henderson, Glasgow, A. Gilliat (Leeds), F. P. Bayley, J. H. Smythe, E. Schofield, A. Heywood, H. Worthington, F. G. Williams, C. F. Ashworth, W. H. Clutterbuck, E. Cross, H. Brassard, A. Johnson, F. Winder, A. G. Willocks, W. P. Bridge, G. W. Howarth, A. Kitchen, T. Wm. J. Singleton, F. Taylor, A. Ferrie, Williamson, Norman Evans, G. W. Mellor, &c.

The Chairman, in opening the conference stated that it had been called by the Association to give expression to the claims of merchants to recognition and representation under the new bill. There was formerly a tendency, he feared, in official quarters to regard the merchant community rather in the light of parasites, but it now appeared that there was a fuller realisation of the essential part they had played in developing British trade throughout the world. Consumers, he was glad to say, freely admitted their indebtedness to traders for the continuance of their supplies, and were disposed to support their claim to recognition. Describing negotiations between the Association and the Board of Trade, the Chairman stated that it was quite possible it might be found that the five representatives supposed to have been allotted to the users might include a representative of the traders. There was good ground also for believing that the distribution of British-made dyestuffs would not be the exclusive monopoly of the manufacturers, but that British indent houses would definitely be recognised. Finally, he expressed satisfaction that the representations made on behalf of traders to the Board of Trade had found expression in one of the clauses of the bill providing for import of goods for re-exportation.

On the motion of Mr. F. G. Williams, seconded by Mr. Heywood, the conference unanimously approved and endorsed the following resolution, which had been adopted by the Executive Council in the morning:—

This Council submits to the President of the Board of Trade that the traders in chemicals and dyestuffs, including many importers and exporters of such commodities, are directly interested in the Dyestuffs (Import Regulation) Bill now before the House of Commons, and respectfully requests that the traders' interest should be directly represented upon the Advisory Committee to be appointed to advise the Board of Trade.

This Council further suggests (a) that no action should be taken that would make it possible for a monopoly to be created in the importation and distribution of dyestuffs under such licences as may be granted, and that due regard should be given to the interests of firms who have had long experience and have established channels for importation and distribution; (b) that the manufacturers should not be allowed to pursue a policy of discriminating against the merchant interests, as by so doing restraint and diversion of important trade would inevitably ensue, much to the national detriment.

A general discussion followed and the Association was asked to forward a number of suggestions for consideration during the Committee stage of the Bill.

#### Thanks to the Association

In moving a vote of thanks to the Association for convening the conference and to Mr. Reynolds for presiding, Mr. F. G. Williams said they were all deeply indebted to the Committee of the Association for the excellent work they had done on behalf of the trader interest (applause). The stronger the Association was in numbers the more influential it would become. It was hopeless for individuals to bring pressure upon the Government, but the chairman's account of what the Association had already accomplished showed what could be done by working together.



## Estimation of Sulphur by the Lamp Method

By F. Esling, A.C.G.I., A.I.C.

At a meeting of the Institution of Petroleum Technologists at the Royal Society of Arts on Tuesday, Dr. W. R. Ormandy occupied the chair in place of Sir Frederick W. Black, who was unable to attend.

In the absence of the author, Dr. Dunstan read the following paper on the "Estimation of Sulphur by the Lamp Method," by Mr. F. Esling, and to save time made running comments rather than contributing to the subsequent discussion. The author said:

The method for which this apparatus was devised is to burn a weighed or weighable quantity of the oil either *per se* or in solution in a sulphur free solvent, absorbing the products of combustion in a measured volume of standard sodium carbonate solution which is finally titrated with a standard sulphuric acid solution. Like most rapid methods, this one is not attended with absolute mathematical precision; at the same time, the experienced and careful operator can obtain figures reliable to a few units in the third place of decimals in percentage. All methods of sulphur estimation undoubtedly have their disadvantages, but I believe that in this instance they are more apparent than real, particularly when the apparatus is in the hands of a trained chemist.

The apparatus consists of (1) a small lamp made entirely of glass, which is small and light for the purpose of weighing; the centre tube of the lamp which carries the wick should have an internal diameter of 3 mm. and should reach almost to the bottom of the container, the capacity of which is approximately 10 c.c. The side arm attached to the body of the lamp is for the purpose of adding small quantities of solvent. The stopper is provided with a small wick to keep the interior of the lamp always at atmospheric pressure. The wick used is ordinary cotton wick as sold by chemical apparatus merchants for use in spirit lamps; a sufficient number of strands should be employed so as to fill the centre tube comfortably, being neither too loose nor too tight.

(2) A pair of bulbs of the U-tube type, with an anti-splash bulb at the top of one of them; the shorter bulb is left empty and acts as a partial condenser for the products of combustion; the second and longer of the two absorption bulbs is packed fairly closely with well-washed glass wool. It is necessary to make a particular point of the washing of the glass wool. In my earlier experiments in this direction, carried out in 1912, I used small glass beads; these served the purpose well for the class of oil I was working with at the time, which contained 0.2 to 0.8 per cent. sulphur; but later, on a different class of petroleum distillates with one-tenth the quantity of sulphur, it was found desirable to increase the absorption surface as much as possible, hence the use of glass-wool.

My first attempts with glass-wool resulted in chaos, owing, I found, to the wool being strongly alkaline (a very persistent property even after many washings); this led me to wash my glass-wool very thoroughly with acid and water until neutral. I used strong nitric acid and boiled well; but this is probably unnecessary—dilute acid may do equally as well. I imagined I had encountered a particularly bad sample, and consequently made no point of its alkalinity; however, both Mr. Guthrie, in Egypt, and Mr. Brewster, in Persia, have since experienced the same trouble and have communicated to me their difficulties in endeavouring to obtain neutral wool. The rest of the apparatus consists of (3) a small glass chimney beneath which the lamp is placed; (4) a suitable stand, and (5) a filter-pump or other convenient apparatus for aspiration.

### Process Applied to Lamp Oils

The simplest class of oil that can be burnt in an apparatus of this type is obviously an oil that will burn by itself with a clear flame, such an oil as lamp oil, kerosene, or paraffin oil. In such cases the method is to fill a small quantity of the oil into the lamp and weigh it; the apparatus being fitted up and 20 c.c.s. of a sixteenth normal solution of  $\text{Na}_2\text{CO}_3$  added to the absorption bulbs, the pump is started and the lamp lighted and placed beneath the chimney. The draught should be regulated so as to maintain a clear non-smoky flame—a fairly rapid draught is usually required. Using

methyl orange as indicator, the titration with sixteenth normal  $\text{H}_2\text{SO}_4$  is performed to a pre-determined end-point. Sixteenth normal solutions are used to simplify the calculation.

### Highly Volatile Oils

The method was originally devised for the testing of lamp oils, but I have been able, by the use of various solvents, to extend it to other types of petroleum oils. The main difference being that a predetermined weight of oil is burnt, using a sufficient quantity of solvent for the purpose. In the case of petrol, benzol, and substances of like nature, with a very low flash point, it is found not possible to burn these direct owing to the excessive tendency to smoking which cannot be controlled. The usual procedure in such cases is to dilute the spirit with absolute alcohol. It might be added here that in hot climates the absolute alcohol could conveniently be replaced by a higher boiling solvent, such as amyl alcohol or amyl acetate, or by a mixture of amyl and ethyl alcohols, which would tend to give a more readily controlled flame. In temperate climates a 20 per cent. solution of petrol in alcohol gives a clear burning mixture. A definite measured volume of the alcohol spirit is burnt.

The time for the completion of a test on motor spirit is approximately three hours. It is unnecessary to remark that the atmosphere of the laboratory should be uncontaminated with acid fumes, ammonia,  $\text{H}_2\text{S}$  or  $\text{SO}_2$ , &c., since a large volume of air gets drawn through the bulbs during the course of a three-hour test.

### High Flash-point Oils

For oils of this type (and all other oils of low volatility and poor capillarity) it is generally possible to weigh directly into the lamp from a small beaker, or to use a Lunge-Rey pipette. According to the class of oil and its possible sulphur content, the operator can best determine for himself whether 0.2 or 1.0 gramme should be taken for a test. With an oil of moderate sulphur content I have used 0.25 gramme with quite satisfactory results.

A mixture of ethyl and amyl alcohols, or amyl alcohol itself, may be used to assist the combustion of oils such as gas oil, intermediate oil, jute, batching oils, and even thin paraffin-free lubricating oils. For heavier oils, such as cylinder oil, heavy lubricating oils, greases of a petroleum, jelly nature, distillate fuel oils of shale oil type, and some crude oils which are free from asphaltic bodies; it has been found preferable to use amyl acetate as a solvent. Having weighed out the required amount of oil, either directly or from a Lunge-Rey pipette, 5 to 6 cc. of the solvent are added to get the oil into solution, and the lamp is burnt in the usual way, adding two or three small quantities of solvent to complete combustion of the oil. Generally speaking, owing to the lower volatility of the solvents employed and the still lower volatility of the oil itself, the actual combustion of oils of this class takes anything from 3 to 4½ hours. Again, it is necessary to run blank determinations on the solvent. The author would like to make it quite clear that, although the method and apparatus he puts forward here may be used with very fair degree of accuracy for determination of sulphur in oils of these classes, the Bomb method must still take precedence in cases where extreme accuracy is of first importance. For the other classes of oils dealt with above, this remark does not apply.

### Typical Results

In the case of petrol testing, the time taken was usually about three hours. It was therefore essential to make careful Blank tests with the object in view of not only checking the alcohol, but more particularly the influence of possible acid contamination in the air. The question arose as to whether the sulphur present in the oil was all converted to sulphuric acid, or part was left in the less oxidised state of sulphur dioxide; and if so, how will this affect the final titration. A further doubt also arose as to whether organic acids might be produced during a combustion and materially affect the result. The first doubt relating to atmospheric contamination was allayed by the blank tests showing no result at any time; care was naturally taken to keep the air of the laboratory as free as possible from contamination. In the question of complete or partial oxidation it is doubtful if such a case as partial oxidation would materially affect the end-point tint, which is supported by the fact that gravimetric results obtained by the usual process of oxidation with bromine and precipitation as barium sulphate, have shown very little difference from the



volumetric results, a fact which *also* show that any fears that organic acids might be produced in quantity sufficient to cause a noticeable error were unsubstantiated.

In the case of the eight kerosenes I have applied the principle of "mean squared error" to obtain the degree of possible error over the whole operation. The quantity burnt averaged between 0.8 and 1.0 gramme, and the sulphur content approximated 0.09 per cent.

In motor spirit testing it is generally found that the pipettes used for measuring out the motor spirit and the alcohol spirit mixture will deliver to a greater accuracy than when delivering water solutions; and with these apparatus, in conjunction with a spec. grav. hydro-meter reading to the third place of decimals, it has been estimated that the possible error does not exceed 0.01 grms. of the actual undiluted spirit. The quantity burnt in a test amounts to 1.4 to 1.5 grms. An effort to minimise the error of burette reading is attempted by using a  $N_{/32}$  solution of acid for the final titration; but a good light and a well-practised eye are essential in order to distinguish the difference in tint made in 200 cc. of solution by half a drop of  $N_{/32}$  acid; nevertheless, this is not asking for the impossible.

#### Other Workers, their Suggestions and Methods

The Carius method still remains unquestionably the accurate method; its general use in works-laboratories is just as unquestionable.

The Referee test for gases, and the modified form for benzols, still enjoys fairly extensive use; it cannot be called rapid.

The Bomb Calorimeter, as originally devised by Berthelot, modified to a cheap form by Mahler, and still further modified by other workers, such as Cook and Krocker, is used to a considerable extent in the petroleum trade. However, its use for the determination of sulphur in very volatile oils is always attended with grave doubts owing to the unavoidable losses due to evaporation of the light substances. For oils of low volatility it gives almost everything desired except rapidity.

Lamp methods applied to motor fuels have been fairly extensively adopted, the majority of the methods being completed by gravimetric determination of the sulphur as barium sulphate; the solution used as absorbent for the products of combustion, however, shows greater variety.

Dr. Ormandy advocated the use of quartz rather than glass for this kind of work. The apparatus was there to be inspected.

Dr. Thole, Mr. Lomax and Mr. H. V. Mitchell took part in a very brief discussion.

#### Imperial College of Science

At the first college dinner at Connaught Rooms on Tuesday the Marquis of Crewe, the Chairman, referred to the subject of the Claim of the Imperial College of Science and Technology to University status. The Marquis was supported by Lord Moulton. Sir Alfred Keogh proposed "The Defensive Forces of the Empire," and in doing so pointed out that what the College had preached for years, and had not been listened to, was the relation of science to industry, which was the same thing as the relation of science to war. Their three amalgamated colleges were able to serve the country well, each standing for something special—the City and Guilds (Engineering) College was definitely identified with the Air Force, the Royal School of Mines with the glorious and never-to-be-forgotten tunnelling companies which did such magnificent work in the war, and the Royal College of Science with gas warfare, and especially with gas defence. For the Navy and Army and Air Force to be out of touch with the workers in science was to fall behind the times.

Major J. E. B. Seely responded.

Lord Moulton in submitting "The Imperial College and its Constituent Colleges," said technology made the whole world reap the harvest, the seed of which it owed to pure science.

The Marquis of Crewe, responding, said the three institutions which were embraced in the college still maintained their individuality, as they ought, but they had achieved a corporate existence, and understood each other and were glad to be combined together under the presidency of Sir Alfred Keogh. Their combination had been justified by the continual overlapping of work which had gone on. They believed they were recommending the foundation of a college, but as a matter of fact they were recommending the formation of a university—an institution, that was to say, which possessed all the attributes of a university, and therefore must in some form or another before very long obtain the status of a university.

#### Sharples' Super-Centrifuge

To the Editor of THE CHEMICAL AGE

SIR.—In the interesting article on Centrifugal Extractors and Separators by Mr. S. J. Broadbent, in your issue of the 11th instant, one remark is noticed in connection with the Sharples Super-Centrifuge (which we control for this country), to the effect that early choking of the machine might be expected by reason of the size of the passages through which the liquids flow.

We feel that this might lead to an erroneous idea concerning the whole of the construction and operation of the Sharples machine, and would therefore like to point out, first that this machine is not intended primarily for the purpose of recovering solids out of liquids (excepting in those cases where the amount of solids contained in the liquid are small in percentage, and of high value) but principally for the clarification of liquids from small percentages of solids, colloidal or otherwise, or for the separation of two liquids emulsified together which are immiscible and of different specific gravities.

In the last-named case, naturally, the size of delivery orifice does not come into question; and so far as concerns the clarification of a liquor from suspended solids, colloidal or otherwise, the centrifugal force developed in the Sharples' machine is so intense—amounting to over 16,000 times the settling force obtained under gravity—that all the suspended matter, excepting the very finest colloidal particles, is driven to the wall of the bowl almost immediately after the liquid enters the bottom of the bowl; the amount of solids so deposited on the bowl gradually lessening until near the top of the bowl there will be no solid matter deposited.

The solids are mainly accumulated at the bottom, and only the very finest reach the upper portion of the bowl.

This continues until such time as the solids have built up to the point where they commence to discharge with the liquor, at which time the cleaning of the bowl is due.

The period of running between cleanings may be anything from 1 to 10 hours, varying with the percentage and character of the suspension in the liquor. The actual cleaning of a bowl occupies from 4 minutes to 10 minutes at most.—We are, &c.,

UNITED WATER SOFTENERS, LTD.,

Imperial House, Kingsway, W.C.2.

December 14.

#### Income Tax Relief

To the Editor of THE CHEMICAL AGE.

SIR.—In view of the issue of Demand Notes for payment of the first instalment of tax due on 1st January, 1921, it becomes increasingly urgent that taxpayers should carefully verify the amount they are called upon to pay, both on earned and unearned income.

It is quite evident that many taxpayers have not received the allowances and deductions on the new basis of taxation, owing to the fact that returns were made months ago on the old forms, and to the non-completion of returns in many other cases; the latter is particularly true of persons who formerly made no claim on account of their total income exceeding the allowable limits. What must be emphasised is that all taxpayers may now claim the allowances and deductions irrespective of the amount of total income. Not only are there allowable deductions to taxpayers in respect of expenses, earned income, personal allowances, housekeeper, widowed mother, children, dependent relatives and life assurance, but after these deductions have been made, the first £225 of taxable income is assessable at 3s. and not at 6s. Even if a claim can only be made for the personal allowance of £225 and the 3s. rate on the next £225 of income, a saving would be effected of £101 5s., which would be increased as and where further allowances can be claimed.

The Revenue Authorities are apparently doing their best, in the difficult situation brought about by the late passing of the Finance Act, to meet claims for reduction.

So far as super-tax payers are concerned, they should receive a special intimation of the allowable deductions they are entitled to for the first time this year.—Yours, &c.,

W. R. FAIRBROTHER.

67/68, Cheapside, E.C.2.

### Motor Spirit from Gas Works

At a meeting of the Newcastle Chemical Club a very long and interesting paper on "The Manufacture of Motor Spirit in Gas Works," was read by Mr. S. Nicholls.

Mr. Nicholls commenced by pointing out that the great extension of motor transport and the shortage of petrol had greatly enhanced the value of benzol as a motor fuel of recent years. Prior to the war the recovery of benzol was confined to coke-oven plants, the production amounting to some 40 million gallons per annum. It was computed that if the recovery of benzol was extensively practised in gas works of the country the figure could be increased to 100 million gallons—an amount which would go far to meet the demand for motor fuel besides breaking down the monopoly held by the petrol importers. Mr. Nicholls went minutely into the composition of benzol before describing the operation of recovery as applied in gas works. Retort benches were often designed to separate the gas and tar rapidly and at as high a temperature as possible. Hence, when during the war attempts were made to recover benzol by means of tar it was necessary, to get a satisfactory yield of benzol, to bring the tar and gas into intimate contact again at low temperatures. That was effected by means of spraying the gas with cold tar in suitable scrubbing towers, subsequently recovering the benzol when the tar was distilled. There were, however, several disadvantages attaching to the use of tar as, for instance, tar was too viscous at high temperatures in winter for scrubbing towers; the amount of tar produced by the carbonisation of 1 ton of coal only amounted to 11 gallons with which to wash 12,000 cubic ft.; and the maximum efficiency obtained was only 50 per cent., as compared with 80 or 90 per cent. by oil washing. Blast furnace oil had been used as a diluent, but there was the disadvantage of the paraffin present. Paraffin oil had been used satisfactorily whilst anthracene or green oil was extensively used. Mr. Nicholls described the process of debenzolising, refining, washing, rectifying in detail. The working of a benzol plant at a gas works required a very strict chemical control and a staff of good intelligence. A careful watch had to be made on all processes to prevent losses. A somewhat elaborate system of keeping stocks was necessary carried out daily. Whether it paid to recover benzol from coal gas could not be decided until some satisfactory basis was arrived at for debiting the benzol plant with the value of hydrocarbons involved. At coke ovens not supplying town gas it had not been usual to debit anything to the benzol on account of this as the gas was surplus, but when the question of town supply was involved or when gas was sold on a thermal basis it was necessary to make a charge for the thermal units removed. The question was not at all a simple one as distribution costs were increased to some extent by the necessity of distributing gas of a lower calorific value in the case of washed gas. He dismissed the question of carburising back to the original calorific value as quite impossible. The fairest way of calculating the price of hydrocarbons is based on the system of charging so much per gallon of crude benzol recovered against the process. Crude benzol of average quality consisted of 80 per cent. approx. of unwashed products which are removed from the gas. The average calorific value could be taken as 16,500 B.T.U. per lb. A final point he dealt with was the question of washing gas from vertical retorts. During the war that was not done owing to the amount of paraffin in vertical gas. Paraffin had already been used as a motor fuel, and so there appeared to be no objection to a little paraffin appearing in motor spirit, hence washing might be profitably undertaken on vertical retort gas as well as horizontal gas.

### Roumanian Oil: Crown Appeal

ROUMANIAN Consolidated Oilfields, Ltd., last March gained a verdict in the King's Bench Division with regard to a petition of right against the British Government. The Company claimed £1,255,513 for the destruction of their property by the British Military Mission during the war. The Crown has now appealed against the decision by Mr. Justice Darling. More than four years have now elapsed since the Company's property was destroyed and compensation has not yet been received. The directors are indisposed to make concessions, and will fight the case to a finish.

On Wednesday Lord Justice Banks, giving judgment, said the appeal must be allowed with costs.

### Chemical Matters in Parliament

#### German Dyestuffs Industry

Mr. Churchill, replying to Mr. Doyle (House of Commons, December 14), said that on December 7 mention was then made of the great assistance rendered by the German dye industry in the production of the complex organic compounds required for their chemical warfare campaign. The difficulties and delays which were encountered by the Allies when attempting to prepare these compounds, owing to the lack of fully developed dye-making industries, had also been referred to during the recent discussions on this subject.

#### Key Industries

Sir Robert Horne, replying to Captain R. Terrell (House of Commons, December 13), said that he did not think it would be practicable to discuss particulars of the Key Industries Bill before its introduction. The effect of depreciated foreign exchanges was not limited to key industries. The whole problem of the effect of collapsed exchanges was being carefully considered by H.M. Government.

#### Dyestuffs

Sir Robert Horne, replying to Mr. Briant (House of Commons, December 13), said that in France the tariff duties on chemical products were revised in November, 1919. The classification of coal-tar dyes were considerably elaborated, and the tariff rates on certain classes of such dyes increased. The same law subjected to import licence all colouring materials and chemical products coming into France from Germany in excess of the levy imposed by the Peace Treaty. In the United States of America an Act of 1916 revised the tariff duties on dyestuffs and made provision for the imposition, for at least five years, of special and additional duties on dyes and intermediates. A prohibition of the importation of dyes (except under licence) was established during the war, and was still maintained in force. In Switzerland, dyes of most descriptions were subject to a small duty under the ordinary customs tariff.

#### Glass Importation

Sir P. Lloyd-Greame, replying to Sir P. Magnus (House of Commons, December 8), said that the President of the Board of Trade stated during the debate yesterday that the Government intended to introduce the Bill dealing with key industries other than the dye industry, as the first measure next session.

#### Imperial Mineral Research Bureau (Bauxite)

In reply to questions by Mr. L. Scott (House of Commons, December 8), Lieut.-Colonel Amery stated that the powers and functions of the Imperial Mineral Research Bureau were set out in the Charter of Incorporation, which was published as an appendix to the Progress Report issued by the Bureau in September, 1919, and printed by the Stationery Office. The professional adviser to the Secretary of State for the Colonies on mineral questions had from time to time been asked to advise on points arising in connection with the bauxite industry in British Guiana, and he understood that he had consulted his colleagues on the Bureau. The Bureau had not been asked to examine into such questions on behalf of the Colonial Office. The constitution of the only committee of the Bureau to which questions relating to bauxite are referred was, according to the latest report of the Bureau, as follows:

Mr. J. W. Evans, Professional Adviser to the Secretary of State for the Colonies on minerals; Mr. R. Seligman, Ph.D., Society of Chemical Industry; Mr. Murray Morrison, Institute of Metals; Mr. A. A. Robertson, Australian Alum Company; Mr. Henry J. Jack, Aluminium Corporation, Ltd.; Mr. F. W. Gower, Birmingham Aluminium Castings Company, Ltd.; Mr. William Mills, William Mills, Ltd.; Mr. A. T. Smith, Castner Kellner Alkali Company, Ltd.; Mr. Kenneth Chance, British Cyanides Company, Ltd.; Mr. H. Spence, Peter Spence & Sons, Ltd.; Mr. A. Holmes, Imperial College of Science and Technology; Mr. F. S. Newall, Washington Chemical Company; Mr. Emile Cohn, Vickers Limited.

The Controller of the London Postal Service is appealing for earlier posting of letters. He says out of about 30 million articles posted weekly in the London Town District Letter Boxes, 16½ million fall into the collections made at 5.30 p.m., 6.30 p.m. and 7.30 p.m.

## From Week to Week

Mr. George Rudd Thompson, the Monmouthshire analyst, has been appointed public analyst for Newport.

Dr. F. W. Aston has been awarded the Mackenzie Davidson medal of the Röntgen Society for his work on isotopes.

During the first nine months of 1920 the United States imported 196,628 lbs. of opium, against 470,289 lbs. in 1919, and 131,775 lbs. in 1918, in the corresponding periods.

Principal of the Battersea Polytechnic, Dr. R. H. Pickard has been appointed director of research to the British Leather Manufacturers Research Association.

Mr. R. W. W. Sanderson has been appointed a demonstrator in physics at Birmingham University for the current session.

The library of the Chemical Society will be closed for the Christmas Holidays at 1 p.m. on Thursday, December 23, and will reopen at 10 a.m., on Wednesday, December 29.

John Graham, employed in the dyeing department of Dalmonach Works, Bonhill, died in the Western Infirmary, Glasgow, on December 9, from the effects of accidentally drinking a quantity of ammonia.

Recently appointed head of the Physical Chemistry Branch, Research Department of Woolwich Arsenal, Dr. J. N. Pring was reader in electro-chemistry at the University of Manchester.

Dr. Ernest Anderson, who was recently appointed Professor of General Chemistry at Nebraska University, was for three years Professor of Agricultural Chemistry at Transvaal University College, Pretoria.

A smoke abatement conference will be held in the City Chambers, Glasgow, on December 20. The conference which is being arranged by Lord Provost Paxton will be held under the auspices of the Smoke Abatement League of Great Britain.

In the place of Dr. T. Slater Price, who is now Director of Research to the British Photographic Research Association D. J. Newton Friend has been appointed head of the chemistry department of the Municipal Technical School, Birmingham.

Dr. Sibly, principal of Swansea University College, stated on Monday, December 6, that their departments of metallurgy and chemistry were so full that they did not know where they would be able to do their work next year.

Glasgow Corporation Gas Committee have agreed to appoint a special sub-committee to consider and report as to the advisability of installing plant at the four chemical works, for measuring the quantities of tar and liquor received from the gas works.

Booklets on Zinc Formosul for fat splitting and glycerine bleaching, also on "Hydros" for soap bleaching, giving instructions on the products of Brotherton & Co., Ltd., City Chambers, Leeds, can be obtained by readers of THE CHEMICAL AGE on application to Brotherton's direct.

At a meeting of the Council of the University College of Wales and Monmouthshire at Cardiff on Friday, December 10, Mr. J. H. Shaxby, B.Sc., Lecturer in Physics, was appointed Director of the Viriamu Jones Physical Research Laboratory. Mr. W. E. Grey was awarded a Diploma in Metallurgy.

Dr. G. Rasch, formerly of the Technical "Hochschule" at Aachen has been appointed honorary ordinary professor of pure and applied physics in the University of Heidelberg. Dr. Knoop has been appointed professor of physiological chemistry at Freiburg University. Dr. Knoop recently declined the Chair in that subject at Leipzig.

The death occurred last Saturday, December 11, at the age of 61, of Mr. Tom Williamson, head of the firm of T. R. Williamson, Ltd., varnish manufacturers, of Ripon (Yorks). Mr. Williamson was for 16 years in America engaged in ranching, journalism and Government transport work. He was Mayor of the City in 1896.

Making suggestions as to feasible trade developments to the members of the Cardiff Rotary Club on December 6, Mr. W. H. Evans, one of the senior officers of the Overseas Trade Department of the Board of Trade, pointed out that they had coking ovens in South Wales and might have a synthetical chemicals industry utilising their coal tar fractions.

Six month's imprisonment in the second division was the sentence on Cecil Horace Edwin Hooper, a military motor

driver, for the manslaughter of Edward Orange, an Aldershot chemist, at the Surrey Assizes on December 8. Hooper was driving at 40 to 45 miles an hour, it was estimated, when he knocked down Orange who was cycling.

Speaking at Newcastle to the N. E. Section of the British Association of Chemists, Mr. R. Brightman stated that the Association aimed at restricting the practice of chemistry to properly qualified chemists, and incidentally to have the term "chemist" legally re-defined. They also proposed to secure an adequate minimum salary for every chemist and to protect his interests in every way. Dr. J. H. Paterson took the chair.

Mr. James Colquhoun Irvine, C.B.E., Ph.D., D.Sc., Professor of Chemistry in the University of St. Andrews, has been appointed Principal of the University of St. Andrews in succession to the Rev. Sir John Herkless, D.D., deceased. The new principal has been Professor of Chemistry since 1909, and is also Dean of the Faculty of Science. He was educated in Glasgow and at the Universities of St. Andrews and Leipzig. He has contributed largely to scientific papers.

Burial took place on Friday, December 10, of Mr. Spencer Percival Umfreville Pickering, F.R.S., at Morthoe Cemetery, where, by his own desire before he died, his body was interred in a tomb of solid rock. Mr. Pickering was a chemist of international repute. He made discoveries, particularly on combinations of copper. An old Etonian, and winner of a Balliol scholarship for science, he was admitted as a F.R.S. at the early age of 19.

Awards for the best papers read during the session in connection with Cardiff University College Association of Engineering Students are announced as follows: 1st prize, divided between Messrs. F. D. Smith, "The Scientific Development of the Anti-Submarine Campaign," and E. Gordon Davies, "Some Notes on the Construction of Paravanes"; 2nd prize, Mr. J. Selwyn Caswell, "The Manufacture of Steel"; 3rd prize, Mr. T. E. Harris, "The Diesel Engine."

In a resolution passed by the Executive Committee of the National Peace Council profound regret was expressed that the British Government, as suggested by the Dyestuffs Bill, and shown by the War Office appointment of a Research Committee, are contemplating preparations for the next war involving the employment of poison gas and all the latest possibilities of chemical discovery. It protests against this prostitution of science, and regards it as "calculated to extend, perpetuate and intensify the horrors of international strife."

A deputation consisting of Mr. Hugh Ingledew, Mr. A. Brown, Mr. Charles Dovey and Dr. W. Evans Hoyle, attended before the Cardiff Corporation Finance Committee, on December 6, in support of an application that the Corporation should liquidate the deficit of between £500 and £600 incurred by the local committee in connection with the recent visit of the British Association to Cardiff. It was agreed that the balance-sheet of the fund should be submitted to the City Treasurer before the Committee came to a decision. The local expenses totalled £2,731.

Speaking at a Labour meeting at Ossett (Yorks), on Sunday, December 12, Mr. Ben Turner of Batley, said that one of the remedies for unemployment talked of by the politicians was the protection of the dye industry, but he felt certain that those who were talking about promoting the scheme had some further object in view. They were trying to bring about, by chemical research, not only an improvement in dyes, but the production of stronger and more effective poison gas for use in the next war, and he, for one, was not going to be associated with anything of that kind.

Speaking on a discussion at Birmingham City Council on Tuesday, December 7, on the subject of unemployment, Mr. H. Simpson (Gas Workers, General Labourers, &c.) stated that some time ago he asked for an increase of wages for those engaged in the Midland chemical trade. He was told that things would be better if production was increased. Recently he had occasion to make another application, and then he was told that the warehouses were overstocked with chemicals, that the supply had exceeded the demand. At an International Conference on the Continent he was informed exactly the same thing—that there the warehouses were full of chemicals. There was no evidence that profits had been reduced, and factories were being closed. He could not understand the meaning of this unemployment threat. It struck him as artificial.



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- Present technology and future possibilities of the electric furnace as applied in the manufacture of synthetic cast iron, steel, steel castings, ferro-alloys, and in heat treating, brass melting, and the smelting of non-ferrous ores.
- Electric v. combustion furnaces for low temperatures. F. W. Brooke and G. P. Mills. *Chem. & Met. Eng.*, November 24, 1920, pp. 1008-1010.
- FOOD.** Chemistry and the food industry. C. L. Alsberg. *Chem. & Met. Eng.*, November 24, 1920, pp. 1005-1007.
- An outline of the far-reaching importance of applying the principles and the technique of biochemistry to the solution of problems relating to the industries that use agricultural raw materials.
- ELECTROLYSIS.** The fundamentals of the electrolytic diaphragm cell. H. K. Moore. *Chem. & Met. Eng.*, November 24, 1920, pp. 1011-1015.
- Detailed study of brine composition and products during electrolysis in diaphragm cells; current, decomposition, and energy efficiencies; pounds of caustic soda diffused per square foot of diaphragm per hour into saturated brine at varying decomposition efficiencies.
- PULP.** Automatic cooking control for chemical pulp. C. H. Allen. *Chem. & Met. Eng.*, November 24, 1920, pp. 1015-1016.
- CENTRIFUGES.** The application of super-centrifugal force. E. E. Ayres. *Chem. & Met. Eng.*, November 24, 1920, pp. 1025-1026.
- GRAPHITE.** The separation of mineral matter from natural flake graphite. W. C. Ratcliff and J. D. Davis. *Chem. & Met. Eng.*, November 24, 1920, pp. 1027-1028.
- MOLYBDENUM.** Molybdenum during 1917-1919. F. L. Hess. *Chem. & Met. Eng.*, November 24, 1920, pp. 1029-1030.

- PHOSPHORUS HALIDES.** Addition reactions of phosphorus halides; the mechanism of the reaction of the trichloride with benzaldehyde. J. B. Conant and A. D. Macdonald. *J. Amer. Chem. Soc.*, November, 1920, pp. 2337-2348.
- PHTHALEINE.** Mercury derivatives of phthaleine. E. C. White. *J. Amer. Chem. Soc.*, November, 1920, pp. 2355-2366.
- Tetrachloro-phenolphthalein. E. T. Whiting. *J. Amer. Chem. Soc.*, November, 1920, pp. 2366-2368.
- THIOCYANATES.** The action of the Grignard reagent on thiocyanates. R. Adams, H. B. Bramlet, and F. H. Tendick. *J. Amer. Chem. Soc.*, November, 1920, pp. 2369-2374.
- ARSINES.** Condensation of primary arsines with aldehydes. R. Adams and C. S. Palmer. *J. Amer. Chem. Soc.*, November, 1920, pp. 2375-2378.
- TRYPTOPHANE.** The effect of acid hydrolysis upon tryptophane. G. E. Holm and R. A. Gortner. *J. Amer. Chem. Soc.*, November, 1920, pp. 2378-2385.
- DYES.** Isocyanine dyes from lepidine and its homologues. E. Q. Adams and H. L. Haller. *J. Amer. Chem. Soc.*, November, 1920, pp. 2389-2391.
- Synthesis of photosensitizing dyes; dicyanine A. L. A. Mikeska, H. L. Haller and E. R. Adams. *J. Amer. Chem. Soc.*, November, 1920, pp. 2392-2394.
- CARBAZOLE.** A divalent nitrogen derivative of carbazole. G. E. K. Branch and J. F. Smith. *J. Amer. Chem. Soc.*, November, 1920, pp. 2405-2413.
- DIALYSIS.** An apparatus for continuous dialysis or extraction. H. Mann. *J. Biol. Chem.*, November, 1920, pp. 207-209.
- ACETONE.** Certain factors that influence acetone production by *Bacillus acetoethylcum*. C. F. Arzberger, W. H. Peterson, and E. B. Fred. *J. Biol. Chem.*, November, 1920, pp. 465-479.
- GELATIN.** Amino-acids of gelatin. H. D. Dakin. *J. Biol. Chem.*, November, 1920, pp. 499-529.

## French

- SULPHIDES.** Phosphorescent sulphides and their applications. A. A. Guntz. *Chim. et Ind.*, November, 1920, pp. 597-611.
- ANALYSIS.** Estimation of ammoniacal nitrogen in complex fertilisers having a basis of calcium cyanamide and ammoniacal salts. J. Froidevaux and H. Vandenbergh. *Chim. et Ind.*, November, 1920, pp. 612-616.
- TRINITRO-METAXYLENE.** The item under this heading in our issue of October 23 was from "Annales de Chimie Analytique et de Chimie Appliquée," and not as stated.

## German

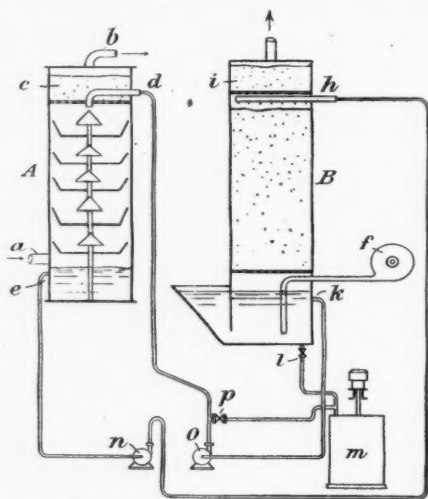
- ELECTROLYTES.** The accurate measurement of the electrical conductivity of electrolytes at temperatures up to 1,600°C. F. M. Jaeger and B. Kapma. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 27-58.
- DIFFUSION.** On the calculation of the diffusion-constants of dissolved substances. H. v. Euler and A. Hedelius. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 59-68.
- THIOSULPHATES.** On some antimony alkali thiosulphates. J. v. Szilágyi. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 69-74.
- The properties of potassium arsenothiosulphate; a contribution to our knowledge of the structural formula of trithionic acid. J. v. Szilágyi. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 75-84.
- ELECTROLYTES.** On the connection between the limiting conductivity of binary electrolytes in non-aqueous solvents and the viscosity of the solvent. P. Walden. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 85-97.
- GRAPHITE.** On the solubility of graphite in molten iron. R. Ruer and J. Biren. *Z. anorg. u. allg. Chem.*, October 6, 1920, pp. 98-112.
- IONS.** On ionic velocities in non-aqueous solutions. P. Walden. *Z. anorg. u. allg. Chem.*, October 15, 1920, pp. 113-124.
- On ionic dimensions in non-aqueous solutions. P. Walden. *Z. anorg. u. allg. Chem.*, October 15, 1920, pp. 125-130.



153,665. SULPHUR FROM GASES, REMOVAL OF.  
N. E. Rambush, Parkfield Works, Stockton-on-Tees.

Application date, August 11, 1919.

Gas which has been cleaned and cooled is passed by the pipe *a* into an absorption tower *A*, into which a suspension of ferric oxide in water or a salt solution is passed by the pipe *d* and flows over distributing cones and discs. The sulphuretted hydrogen is absorbed, and the gas passes through a filter *c* to remove spray and is drawn off by the pipe *b*. The suspension is drawn off by the pipe *e* to the pump *n*, which



153,665

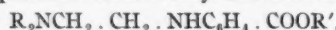
forces it to a spraying device *h* at the top of a revivifying tower *B*, where it is treated in a divided condition with air supplied by a blower *f*. The revivified material is drawn off at *k* by a pump *o* and returned to the tower *A*. Part of the suspended material is continuously or periodically transferred to a centrifugal separator *m* directly through a valve *l*, or through a valve *p* on the delivery side of the pump *o*. The sulphur is separated and the suspended material is returned to the absorbing system.

153,796. PHENOL RESIN CONDENSATES, PRODUCTION OF. F. Scudder and R. Pettigrew, 44, Mosley Street, Manchester.  
Application date, December 16, 1919.

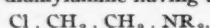
The object is to produce a phenol resin condensate suitable for impregnating materials, more particularly friction surfaces, without clogging the surface pores. A mixture of 40 per cent. formaldehyde 100 parts, phenol 100 parts, and sodium sulphite 5 parts, is agitated for 3 to 4 days at atmospheric temperature, when the condensate separates out at the bottom and a watery layer at the top. The phenol used is preferably the light-brown liquor left after crystallisation, and containing about 90 per cent. phenol and its homologues. The resinous condensate is a thin liquid which is quite stable and of high penetrating power without the use of alcohol or other diluent. The material after impregnation is dried at 80°C.-90°C., and then heated under pressure. Ordinary water-soluble dyes are soluble in the liquid condensate.

153,827.  $\beta$ -DIALKYLAMINO-ETHYLAMINO BENZOIC ALKYL ESTERS, PROCESS OF MANUFACTURE OF. Société Chimique des Usines du Rhone, anciennement Gilliard, P. Monnet et Cartier, 89, Rue de Miromesnil, Paris. International Convention date (France), November 15, 1919. Addition to 128,554. (See THE CHEMICAL AGE, Vol. I., p. 646.)

Specification 128,554 describes the manufacture of  $\beta$ -alkyl-amino-ethyl paramino benzoic alkyl esters having the formula



where R=hydrogen or an alkyl radical, and R'=an alkyl radical, by the reaction of a  $\beta$ -halogen-ethyl paramino benzoic alkyl ester with an alkylamine. It is now found that these esters may be produced by first heating in equal molecular proportions a mixture of a paramino benzoic acid alkyl ester with a  $\beta$ -chloroethyl-dialkylamine having the formula



Alternatively, these compounds may be used in solution in a neutral solvent. The mono-hydrochloride obtained in the above reaction is then treated with the equivalent amount of alkali to separate the ester-base. Many examples are given.

NOTE.—The following specifications which are now accepted were abstracted in THE CHEMICAL AGE when open to inspection under the International Convention: 141,361 (C. Moureu, C. Dufraisse, P. Robin and J. Pougnet), relating to stabilisation of acrolein, see Vol. II., p. 671; 146,110 (Farbwerke vorm. Meister, Lucius & Bruning), relating to manufacture of methane, see Vol. III., p. 320.

### International Specifications Not Yet Accepted

151,583. CYANAMIDE. Wargons Aktiebolag and J. H. Lidholm, Wargon, Sweden. International Convention date, September 19, 1919.

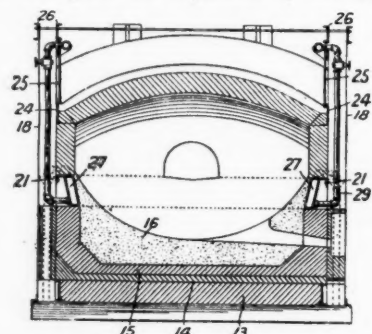
Calcium cyanamide is added gradually to water, or to a cyanamide solution at a temperature below 70°C., while carbon dioxide under pressure is blown in through nozzles in sufficient quantity to maintain the solution neutral or slightly alkaline. Alternatively, the gas may be brought into intimate contact with the liquid by means of beaters, or a solution containing calcium cyanamide may be sprayed into carbon dioxide or into combustion or other gases containing it. Cyanamide is thus obtained free from dicyandiamide.

151,596. UREA. Soc. d'Etudes Chimiques pour l'Industrie, 8, Quai du Cheval Blanc, Geneva. International Convention date, September 26, 1919.

Powdered calcium cyanamide is gradually added to an acid such as sulphuric, phosphoric, or carbonic which is stirred during the addition, to obtain urea or its salts.

151,631. OPEN-HEARTH FURNACES. S. Naismith, 7337, Yates Avenue, Chicago, U.S.A. International Convention dates April 17, 1916.

A magnesite or dolomite hearth, 16, is supported on magnesite brickwork, 15, and this in turn on first and second grade bricks, 14, 13. The walls and roof are constructed of silica brick. The two parts are separated by cooling boxes, 27,



15,631

arranged on the slag line of the furnace, and supplied with water through the pipes, 29. The walls are supported on beams, 21, bolted to stays, 18, and the roof is supported on beams, 24, suspended from beams, 26, by hangers, 25. Both supports are independent of the hearth.

151,597-8. FERTILIZERS. Soc. d'Etudes Chimiques pour l'Industrie, 8, Quai du Cheval Blanc, Geneva. International Convention date, September 26, 1919.

151,597. Cyanamide is first treated as described in 151,596 to obtain urea or its salts, and an insoluble phosphate such as tri-calcium phosphate, bone ash, basic slag, or natural phosphate is then added, and is dissolved by the excess of acid. When the solution is evaporated, a mixture of urea or its salts, soluble calcium phosphate, and other calcium salts is obtained. In an example, the calcium cyanamide may be suspended in water, and treated with carbon dioxide filtered, sulphuric acid added in excess, and then heated to 70°C. The insoluble phosphate is then added.

151,598. This is a patent of addition to 151,597. The use of sulphuric acid and consequent production of calcium sul-



phate in the process described in 151,597 are avoided by substituting phosphoric acid or a soluble phosphate such as monocalcium orthophosphate. The remainder of the process is similar to that of 151,597.

#### LATEST NOTIFICATIONS.

- 154,894. Hydraulic power systems. Taylor, H. B. December 4, 1919.  
 154,895. Preparation of lubricating and cylinder oils. Thiele, F. C., and Cordes, C. November 24, 1919.  
 154,896. Processes for the production of nitrogen compounds. Thorssell, C. T. December 3, 1919.  
 154,614. Process for producing imitations of galalith, celluloid and the like. Steiner, H. July 5, 1919.  
 154,907. Manufacture of esters of dioxdiethyl sulphide. Farbwerke vorm. Meister, Lucius & Bruning. January 20, 1919.

#### Specifications Accepted, with Date of Application

- 130,334. Ores and oxygen compounds utilised as ores, Reduction of. F. M. Wiberg. July 18, 1918.  
 139,173. Blast furnace-slag, Arrangement for blowing air through— for recovering the sulphur therein contained as sulphur dioxide. L. H. Diehl. September 24, 1917. Addition to 139,172.  
 154,253. Carbonisation or destructive distillation, Method of and apparatus for. Underfeed Stoker Co. and S. McEwen. June 18, 1919.  
 154,304. Acetic acid, Manufacture of. British Cellulose and Chemical Manufacturing Co., M. Soller and J. Hotz. August 21, 1919.  
 154,308. Heat-exchange apparatus. H. Nielsen and F. D. Marshall. August 21, 1919.  
 154,309. Gas-washing apparatus. H. Nielsen and F. D. Marshall. August 21, 1919.  
 154,310. Air-saturating towers. H. Nielsen and F. D. Marshall. August 21, 1919.  
 154,328. Sulphate of ammonia, Manufacture of—and apparatus therefore. N. Wilton. August 25, 1919.  
 154,334. Cellulose acetate, Manufacture of compositions, preparations, or articles having a basis of. H. Dreyfus. August 26, 1919.  
 154,355. Concentration, evaporation, and similar operations. E. C. R. Marks. (*Aktiebolaget Industriare*). September 3, 1919.  
 154,356. Nitrogen, Method and apparatus for the fixation of atmospheric. J. S. Island. September 3, 1919.  
 154,368. Acetic acid, Apparatus for the manufacture of. H. W. Matheson. September 9, 1919.  
 154,464. Hydrocarbon oil, Treatment of. N. V. S. Knibbs. December 20, 1919.  
 154,471. Nickel salt, Method for electrolysing a solution of. C. Heberlein. August 8, 1919.  
 154,472. Hydrobromic acid from bromine and hydrogen, Manufacture of. H. R. Napp. (*A. Tschudi*). January 6, 1920.  
 154,498. Potassium carbonate and sodium carbonate, Process for the manufacture of—by wet process. S. Lamm. March 2, 1920.  
 154,510. Shaft-furnaces especially applicable for the manufacture of cement. F. W. Bakema. May 8, 1920.  
 154,512. Ores and other materials, Apparatus for washing and classifying. R. Haddan. (*Dorr Co.*). May 17, 1920.

#### Applications for Patents

- Bayley, J. Centrifugal separating machines. 35,001. December 11.  
 Bergdahl, B. Method to produce ammonia. 34,715. December 8.  
 Bohrmann, L. H. A. Process for evaporating liquids. 34,919. December 10.  
 Casale, L. Production of nitrogen or mixtures of nitrogen and hydrogen. 34,582. December 7.  
 Dutt, E. E. Decolorisation and purification of saccharine solutions. 34,413. December 6.  
 Dutt, P. C. Decolorisation and purification of saccharine solutions. 34,413. December 6.  
 Fabriques de Produits Chimiques de Thann et de Mulhouse. Manufacture of anhydrous zinc sulphide. 35,008. December 11. (France, December 10, 1919.)  
 Foster, J. Method of preparing lime from limestone, and manufacture of a power gas and ammonia. 34,545. December 7.  
 Fuhrmann, W. Process for prevention of corrosion and formation of fur in steam boilers, condensers, &c. 34,827. December 9.  
 Hazell, J. S. Centrifugal pumps. 34,793. December 9.  
 Healey, F. J. Variable-velocity ratio gearing. 34,727. December 8.  
 Kagan, A. Separating and purifying anthracene and carbazole. 34,733. December 8.  
 Knibbs, N. V. S. Distillation of solid hydrocarbon containing materials. 34,555. December 7.  
 Leek, H. Dyeing, bleaching, tin-weighing, scouring, &c., machines. 34,612. December 8.  
 Leprestre, R. Production of nitrogen or mixtures of nitrogen and hydrogen. 34,582. December 7.  
 Martin, P. P. Apparatus for delivering liquid or granular materials in predetermined quantities. 34,741. December 8. (Belgium, April 12.)

Morgan, J. S. Producing chemical reactions by action of heat. 34,731. December 8.

Heating liquids by introduction into molten metal. 34,732. December 8.

Partington, M. Sets of cards for teaching chemical formulæ and equations. 34,683. December 8.

Perkins, L. P. Carburettors of hydrocarbon engines. 34,511. December 7.

Persch, J. P. Treating petroleum, &c. 34,419. December 6.

Scheibler, H. Process for manufacture of sulphur preparations of the thiophene series. 35,014. December 11. (Germany, April 28, 1914.)

Sutcliffe, E. R. Recovery of gases or vapours. 34,835. December 9.

Thermal Industrial & Chemical (T.I.C.) Research Co. Producing chemical reactions by action of heat. 34,731. December 8.

„ Heating liquids by introduction into molten metal. 34,732. December 8.

#### Patents Court Cases

A DECISION of considerable importance to patentees who have suffered financial loss due to the war has just been given by the Court of Appeal. An application had been made to the Comptroller of Patents for an extension of the terms of several patents dating from 1911 to 1915, relating to rubber machinery and the coagulation of rubber latex, all in the name of Samuel Cleland Davidson. The application was made under Sec. 18 sub-sec. 6 of the Act, which provides for such extension in the event of the remuneration having been inadequate, and the applicant alleged that he had been unable to work the patents owing to the war. Such petitions are normally presented shortly before the expiration of the patent concerned, but the applicant contended that the sole reason for this course was that the Court might be able to judge of the adequacy of the remuneration, that it would be easier to judge this in the present case shortly after the war, and that the patentee would find it advantageous to know at an early stage the commercial value of the patent. At the hearing it was decided that the loss or damage referred to in the Act related to the whole term of the patent, and that the application must stand over until shortly before the expiration of the patents. Applicant appealed, but the Court of Appeal, comprising the Master of the Rolls, and Lords Justices Warrington and Younger, reluctantly decided that no appeal lay from the decision which had been given.

#### Dye Bill and Free Traders

EARL BEAUCHAMP, chairman of the Joint Committee of representatives of all the Free Trade organizations in the country, has issued a resolution passed unanimously at a meeting held on December 8. The resolution is worded:—

“That in the opinion of the members of this committee no system devised for the stimulation or protection of the dye-making industry in this country by means of prohibition tariffs or licences will fulfil the purpose in view, whereas any of these devices will seriously hamper and may prove disastrous to the much larger industries which require prompt and abundant supplies of the best and newest dyes that are being produced in order that they may retain the predominant position they hold at home and abroad.

“That this committee condemns the bill now before Parliament and calls upon all Free-traders, no matter to what party they belong, to oppose the bill in every possible way.

“This committee asserts that to be thoroughly successful the British dye-making industry must not simply copy the production of foreign countries, but must be in a position to turn out better and more attractive dyes than any now available, and that the chief necessity lies in abundant skilled research rather than in an attempt to enable the dye-makers, through protection or partial prohibition, to secure dividends by means of a monopoly for second-rate articles.

“This committee, being of opinion that national defence against aggression is of supreme importance, holds the view that the cost and the preparation entailed should fall directly on the national resources and not on particular industries.”

It is said the German Aniline Syndicate has adopted the policy of intensified concentration owing to competition.

## Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

### Market Report

THURSDAY, December 16.

There is no improvement to be detected in the demand for general chemicals, and the present stagnation is likely to continue over the New Year.

It is thought in many directions that values are now approaching bottom, and that a re-action in the New Year is not unlikely.

The export demand shows no improvement, and the continued depreciation of Continental exchanges is not a healthy sign.

### General Chemicals

ACETONE remains in steady demand, and the price is fully maintained.

ACID ACETIC is a slow market, and without change in price.

ACID CARBOLIC is again easier, and very little business is doing.

ACID FORMIC.—The lower values which we indicated last week have again been in evidence, and the demand remains very slow.

ACID OXALIC is only a nominal market, and continues to favour buyers.

ACID TARTARIC.—Certain Continental offerings have been strongly in evidence, but care should be exercised as quality troubles are not unusual. The market continues under the control of second-hands, and the price appears to have reached an uneconomic level.

COPPER SULPHATE still at a dead-lock, and the continual fall in the Continental exchanges does not help matters.

FORMALDEHYDE shows a decidedly healthier tendency, but the price is nominally unchanged.

LEAD SALTS are in very slow demand, and quite uninteresting.

MAGNESIUM SALTS are still slow of sale, and inclined to contract in value.

POTASSIUM BICHRIMATE is very quiet, price nominally unaltered.

POTASSIUM CAUSTIC is again easier, and in very poor demand.

POTASSIUM CARBONATE is offered at lower rates, but only limited parcels are available.

SODA ACETATE is still in good enquiry; the improvement indicated last week has been maintained.

SODA CAUSTIC.—Cheap re-sale parcels still appear on the market, and with a slow export demand, prove rather indigestible.

SODA BICHRIMATE is offered by weak holders, but intrinsically the article seems to be too low in price.

SODA NITRITE is on offer, and there are few buyers.

SODA PRUSSATE is only offered in limited quantities, but the demand is very poor, and the tendency is easy.

### Coal Tar Intermediates

There is practically no change in the position of this market, and business is practically at a standstill.

The undertone, however, continues quite firm.

BETA NAPHTHOL is without change, with very little business passing.

DI NITRO BENZOL is in small request at last quoted figures.

DIMETHYLANILINE is on offer at slightly reduced prices.

NITRO BENZOL is in slightly better demand, without alteration in price.

PARANITRANILINE is without change, but there is practically no business to report.

SALICYLIC ACID makers hold firmly to their prices.

### Coal Tar Products

The market for most coal tar products is inactive, and there is little fresh business doing.

90's BENZOL is very quiet at 3s. 5d. on rails in the North, and 3s. 7d. to 3s. 8d. in London.

PURE BENZOL is worth 3s. 10d. to 4s.

CREOSOTE OIL is fairly firm at 1s. 2d. on rails in the North, and 1s. 3d. in the South.

CRESYLIC ACID is worth 3s. 11d. on rails for 95/97 per cent., and 4s. 3d. for the pale 97/99 per cent. quality.

SOLVENT NAPHTHA remains unchanged at 2s. 9d. on rails.

HEAVY NAPHTHA is worth from 3s. to 3s. 2d.

NAPHTHALENE is weaker with prices ranging from £12 to £20 per ton for the crude qualities, and £35 to £40 per ton for the refined.

PITCH.—There is no change in the position, and buyers still hold off the market.

### Sulphate of Ammonia

There is very little demand at present, notwithstanding the fact that somewhat lower prices are now being accepted for export.

### Current Prices

#### Chemicals

	per	£	s.	d.	to	£	s.	d.
Acetic anhydride .....	lb.	0	2	6	to	0	3	0
Acetone oil .....	ton	90	0	0	to	95	0	0
Acetone, pure .....	ton	115	0	0	to	120	0	0
Acid, Acetic, glacial, 99-100% .....	ton	77	10	0	to	80	0	0
Acetic, 80% pure .....	ton	65	10	0	to	66	0	0
Arsenic .....	ton	100	0	0	to	105	0	0
Boric, cryst. ....	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40% .....	lb.	0	0	10½	to	0	0	11
Citric .....	lb.	0	3	0	to	0	3	3
Formic, 80% .....	ton	90	0	0	to	95	0	0
Gallic, pure .....	lb.	0	6	3	to	0	6	6
Hydrofluoric .....	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol. ....	ton	37	10	0	to	40	0	0
Lactic, 60 vol. ....	ton	47	10	0	to	50	0	0
Nitric, 80 Tw. ....	ton	41	0	0	to	44	0	0
Oxalic .....	lb.	0	1	5	to	0	1	6
Phosphoric, 1.5 .....	ton	65	0	0	to	67	0	0
Pyrogallic, cryst. ....	lb.	0	11	6	to	0	11	0
Salicylic, Technical .....	lb.	0	1	8	to	0	1	10
Salicylic, B.P. ....	lb.	0	2	0	to	0	2	3
Sulphuric, 92-93% .....	ton	8	10	0	to	8	15	0
Tannic, commercial .....	lb.	0	3	6	to	0	3	9
Tartaric .....	lb.	0	2	4	to	0	2	6
Alum, lump .....	ton	19	10	0	to	20	0	0
Alum, chrome .....	ton	60	0	0	to	65	0	0
Alumino ferric .....	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15% .....	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18% .....	ton	20	10	0	to	21	10	0
Ammonia, anhydrous .....	lb.	0	2	2	to	0	2	4
Ammonia, .880 .....	ton	43	0	0	to	45	0	0
Ammonia, .920 .....	ton	30	0	0	to	32	10	0
Ammonia, carbonate .....	lb.	0	0	7½	to	—	—	—
Ammonia, chloride .....	ton	95	0	0	to	100	0	0
Ammonia, muriate (galvanisers) ..	ton	60	0	0	to	65	0	0
Ammonia, nitrate .....	ton	55	0	0	to	60	0	0
Ammonia, phosphate .....	ton	110	0	0	to	115	0	0
Ammonia, sulphocyanide .....	lb.	0	3	0	to	0	3	3
Amyl acetate .....	ton	420	0	0	to	425	0	0
Arsenic, white, powdered .....	ton	80	0	0	to	82	0	0
Barium, carbonate, 92-94% .....	ton	12	10	0	to	13	0	0
Barium, chlorate .....	lb.	0	0	11	to	0	1	0
Chloride .....	ton	23	0	0	to	24	0	0
Nitrate .....	ton	55	0	0	to	56	0	0
Barium Sulphate, blanc fixe, dry ...	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp ...	ton	16	10	0	to	17	0	0
Sulphocyanide, 95% .....	lb.	0	1	6	to	0	1	8
Bleaching powder, 35-37% .....	ton	30	0	0	to	31	0	0
Borax crystals .....	ton	41	0	0	to	42	10	0
Calcium acetate, Brown .....	ton	19	0	0	to	20	0	0
" Grey .....	ton	29	0	0	to	30	0	0
Calcium Carbide .....	ton	29	0	0	to	30	0	0
Chloride .....	ton	12	10	0	to	13	0	0
Carbon bisulphide .....	ton	65	0	0	to	67	0	0
Casein, technical .....	ton	90	0	0	to	92	0	0
Cerium oxalate .....	lb.	0	3	9	to	0	4	0

	per	£	s.	d.	to	£	s.	d.
Chromium acetate .....	lb.	0	1	2	to	0	1	4
Cobalt acetate .....	lb.	0	11	6	to	0	12	6
Oxide, black .....	lb.	1	0	0	to	1	0	6
Copper chloride .....	lb.	0	1	3	to	0	1	6
Sulphate .....	ton	41	0	0	to	42	0	0
Cream Tartar, 98-100% .....	ton	220	0	0	to	225	0	0
Epsom salts (see Magnesium sulphate)								
Formaldehyde 40% vol. ....	ton	135	0	0	to	140	0	0
Formusol (Rongalite) .....	lb.	0	4	9	to	0	5	1
Glauber salts .....	ton	Nominal.						
Glycerine, crude .....	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols. ....	gal.	0	2	8	to	0	2	9
Iron perchloride .....	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas) .....	ton	4	0	0	to	4	5	0
Lead acetate, white .....	ton	67	10	0	to	70	0	0
Carbonate (White Lead) .....	ton	61	0	0	to	63	0	0
Nitrate .....	ton	62	10	0	to	65	0	0
Litharge .....	ton	57	0	0	to	59	0	0
Lithopone, 30% .....	ton	40	0	0	to	41	0	0
Magnesium chloride .....	ton	15	10	0	to	16	10	0
Carbonate, light .....	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial) .....	ton	12	10	0	to	13	0	0
Sulphate (Druggists') .....	ton	18	10	0	to	19	10	0
Manganese, Borate .....	ton	190	0	0	to	—		
Sulphate .....	ton	130	0	0	to	135	0	0
Methyl acetone .....	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone .....	gall.	Nominal.						
Nickel sulphate, single salt .....	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt .....	ton	62	0	0	to	64	0	0
Potassium bichromate .....	lb.	0	1	3	to	0	1	4
Carbonate, 90% .....	ton	90	0	0	to	95	0	0
Chloride .....	ton	50	0	0	to	52	0	0
Chlorate .....	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52% .....	ton	215	0	0	to	225	0	0
Nitrate, refined .....	ton	65	0	0	to	67	0	0
Permanganate .....	lb.	0	3	0	to	0	3	3
Prussiate, red .....	lb.	0	3	3	to	0	3	6
Prussiate, yellow .....	lb.	0	1	10	to	0	2	0
Sulphate, 90% .....	ton	31	0	0	to	33	0	0
Salammoniac, firsts .....	cwt.	5	10	0	to	—		
Seconds .....	cwt.	5	5	0	to	—		
Sodium acetate .....	ton	48	0	0	to	50	0	0
Arsenate, 45% .....	ton	60	0	0	to	62	0	0
Bicarbonate .....	ton	10	10	0	to	11	0	0
Bichromate .....	lb.	0	0	9½	to	0	0	10
Bisulphite, 60-62% .....	ton	37	10	0	to	43	0	0
Chlorate .....	lb.	0	0	5½	to	0	0	5½
Caustic, 70% .....	ton	30	0	0	to	31	0	0
Caustic, 76% .....	ton	31	0	0	to	32	0	0
Hydrosulphite, powder, 85% .....	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial .....	ton	27	10	0	to	30	0	0
Nitrite, 96-98% .....	ton	69	0	0	to	70	0	0
Phosphate, crystal .....	ton	37	0	0	to	39	0	0
Perborate .....	lb.	0	2	2	to	0	2	4
Prussiate .....	lb.	0	1	1	to	0	1	1½
Sulphide, crystals .....	ton	25	0	0	to	27	0	0
Sulphide, solid, 60-62% .....	ton	45	0	0	to	47	0	0
Sulphite, cryst. ....	ton	17	10	0	to	18	10	0
Strontium carbonate .....	ton	85	0	0	to	90	0	0
Strontium Nitrate .....	ton	90	0	0	to	95	0	0
Sulphate, white .....	ton	8	10	0	to	10	0	0
Sulphur chloride .....	ton	42	0	0	to	44	10	0
Sulphur, Flowers .....	ton	19	0	0	to	19	10	0
Roll .....	ton	19	0	0	to	19	10	0
Tartar emetic .....	lb.	0	2	10	to	0	3	0
Tin perchloride, 33% .....	lb.	0	2	6	to	0	2	7
Perchloride, solid .....	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals) .....	lb.	0	2	0	to	0	2	1
Zinc chloride, 102 Tw. ....	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98% .....	ton	60	0	0	to	65	0	0
Oxide, 99% .....	ton	56	0	0	to	57	0	0
Dust, 90% .....	ton	90	0	0	to	92	10	0
Sulphate .....	ton	21			to	23	10	0

## Coal Tar Intermediates, &amp;c.

Alphanaphthol, crude .....	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined .....	lb.	0	4	6	to	0	4	9
Alphanaphthylamine .....	lb.	0	3	3	to	0	3	6
Aniline oil, drums extra .....	lb.	0	1	8	to	0	1	9
Aniline salts .....	lb.	0	1	10	to	0	2	0
Anthracene, 85-90% .....	lb.	—			to	—		
Benzaldehyde (free of chlorine) .....	lb.	0	5	9	to	0	6	0
Benzidine, base .....	lb.	0	11	6	to	0	12	0
Benzidine, sulphate .....	lb.	0	10	0	to	0	10	6
Benzoic acid .....	lb.	0	2	9	to	0	3	0
Benzoate of soda .....	lb.	0	3	0	to	0	3	3
Benzyl chloride, technical .....	lb.	0	2	0	to	0	2	3

	per	£	s.	d.	to	£	s.	d.
Betanaphthol benzoate .....	lb.	0	10	0	to	0	11	0
Betanaphthol .....	lb.	0	3	0	to	0	3	3
Betanaphthylamine, technical .....	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis .....	lb.	0	5	0	to	0	6	3
Dichlorobenzol .....	lb.	0	0	9	to	0	0	10
Diethylaniline .....	lb.	0	6	9	to	0	7	6
Dinitrobenzol .....	lb.	0	1	5	to	0	1	6
Dinitrochlorobenzol .....	lb.	0	1	5	to	0	1	6
Dinitronaphthalene .....	lb.	0	1	6	to	0	1	8
Dinitrotoluol .....	lb.	0	1	8	to	0	1	9
Dinitrophenol .....	lb.	0	3	0	to	0	3	3
Dimethylaniline .....	lb.	0	5	9	to	0	6	0
Diphenylamine .....	lb.	0	5	0	to	0	5	3
H-Acid .....	lb.	0	14	0	to	14	6	
Metaphenylenediamine .....	lb.	0	5	9	to	6	0	
Monochlorobenzol .....	lb.	0	0	10	to	0	1	0
Metanilic Acid .....	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2.7) .....	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude .....	lb.	0	4	0	to	0	4	3
Naphthionate of Soda .....	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid .....	lb.	0	5	0	to	0	5	6
Nitronaphthalene .....	lb.	0	1	6	to	0	1	8
Nitrotoluol .....	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base .....	lb.	0	18	0	to	1	0	0
Orthodichlorobenzol .....	lb.	0	1	1	to	0	1	2
Orthotoluidine .....	lb.	0	2	3	to	0	2	6
Orthonitrotoluol .....	lb.	0	1	3	to	0	1	4
Para-amidophenol, base .....	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor .....	lb.	0	13	0	to	0	13	6
Paradichlorobenzol .....	lb.	0	0	7	to	0	0	8
Paranitraniline .....	lb.	0	7	6	to	0	7	9
Paranitrophenol .....	lb.	0	2	9	to	0	3	0
Paranitrotoluol .....	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled .....	lb.	0	13	6	to	0	14	6
Paratoluidine .....	lb.	0	8	3	to	0	8	6
Phthalic anhydride .....	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis .....	lb.	0	4	0	to	0	4	3
Resorcin, technical .....	lb.	0	7	6	to	0	8	6
Resorcin, pure .....	lb.	1	2	0	to	0	12	6
Salol .....	lb.	0	4	6	to	0	4	9
Shaeffer acid, 100% basis .....	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude .....	lb.	0	1	8	to	0	1	9
Tolidine, base .....	lb.	0	8	6	to	0	10	0
Tolidine, mixture .....	lb.	0	2	9	to	0	3	0

## Cardiff By-Products Market

CARDIFF, WEDNESDAY.

Sulphate of Ammonia—	
For home consumption (per ton o.t.) .....	£25 net d./d.
For export (per ton f.o.b.) .....	£30 to £40
Benzol, 90's (per gallon) .....	3s. 5d. to 3s. 10d.
Benzol, 50's (per gallon) .....	3s. 5d.
Solvent naphtha (per gallon) .....	3s. 1d. to 3s. 3d.
Heavy naphtha (per gallon) .....	3s. 3d. to 3s. 4½d.
Crude naphthalene salts (per ton) .....	£16 to £26
Pitch (per ton) .....	190s. to 200s.
Cresote (per gallon) .....	1s. 2d. to 1s. 4d.
Motor benzol (per gallon) .....	3s. 5d. to 3s. 10d.
Crude benzol (per gallon) .....	1s. 9d.
Toluol (per gallon) .....	4s.

## Alsation Potash

Quotations for French Kainit, 14 per cent., during the past week have been approximately £6 15s., and for French potash manure salts, 20 per cent., £7 15s. f.o.r. Muriate of potash from France is quoted at £26 10s. All these grades of potash are in exceptionally dry condition, a great advantage for transit and storage in bags. When stacked under dry conditions these potash salts from France can be kept for many months without setting, and there is no danger of the bags being damaged by the salts. Farmers find difficulty in purchasing fertilisers of any kind at the present time, owing to the unexpected shortening of credits, with falling prices for grain and farm produce generally. With regard to the purchase of potash, this is all the more to be regretted since now is the most advantageous time for application of potash fertilisers. Although potash salts give very profitable returns on most soils even when applied late in spring, the winter application of these fertilisers give much better results. There is no danger of potash being washed out of the soil, and where fertilisers of this kind can be applied in winter, it is a great consideration to have the work carried out during the slack season. Good stocks of French kainit and French potash salts are now on hand, and purchasers have the advantage of obtaining very favourable quotations at the present time.



## Company News

**EGYPTIAN SALT AND SODA.**—A dividend of 30 per cent. (6s. per share) for year has been declared; £E15,372 for depreciation of various factories; £E7,762 to write down value of investments; £E7,000 as provision for eventualities; £E40,000 to reserve to meet expenditure towards the completion of the Moharrem Bey Works; £E301,125 forward. Last year the figures were 45 per cent. dividend; £E19,304 for depreciation of various factories, including £E1,683 for writing down value of patent rights for new oil processes; £E123,957 forward.

**INDIA RUBBER, GUTTA PERCHA.**—For the year ended September 30 the net profit of the India Rubber, Gutta Percha & Telegraph Works Company was £73,300, and £100,368 was brought forward. Dividends paid absorbed £31,250, leaving a disposable balance of £142,418. There is sufficient to pay the usual dividend on the ordinary shares, but the directors feel obliged to defer recommending the payment owing to the present scarcity of cash. It is hoped to be possible later on to pay a six months' dividend to the ordinary shareholders out of the balance shown at the end of the year.

**CASTNER-KELLNER ALKALI.**—The net profit for the year ended September 30 was £283,834 (against £190,655), and £51,876 brought forward, as compared with £48,819. Available balance £228,132 (against £171,876). To depreciation reserve £50,000 (same); grant to universities, £10,000; final dividend of 12 per cent., making 22 per cent. for the year, payable on December 21 (this is against 13 per cent. last year); forward, £48,132. The profit was struck after making provision for E.P.D. and corporation tax. During the past year Brunner, Mond purchased nearly the whole of the Castner-Kellner shares in the hands of the public.

**SULPHIDE CORPORATION.**—The report for the year ended June 26 states that, notwithstanding the cessation of smelting operations, the acid and superphosphate plants worked intermittently throughout the year, the production being 13,222 tons and 17,398 tons respectively (as compared with 15,524 tons and 25,448 tons in the previous year). Owing to the growing demand for acid by outside firms, it has been decided to add a further unit to the existing plant, whereby an additional 250 tons per week will gradually be made available for sale to other consumers in Australia. The net profit amounted to £2,874, which will be dealt with in the next accounts.

**ANGLO-PERSIAN OIL.**—The profit for the year ended March 31, after allowing for depreciation, &c., amounted to £2,611,615 (against £2,010,805 in the previous year) and £275,528 was brought forward, making £2,887,143, from which is deducted stamp duty, registration fees, &c., on increased capital and debenture stock, and expenses of issue £233,302, leaving £2,653,841. Appropriations have been made as follows: To debenture stock redemption reserve, £80,000; preference share reserve, £50,000; general reserve, £575,000; amortisation reserve, £100,000; leaving £1,848,841. Further dividends, less tax, of 20 per cent. per annum on the amounts paid up on the ordinary shares are recommended, and 2 per cent. per annum additional on the preference shares, making 8 per cent. for the year, leaving £910,978 to be carried forward, subject to E.P.D. In December last year an issue was made of 3,000,000 participating preference shares of £1 each, at a premium of 3s. per share, 4,500,000 ordinary shares of £1 each (of which 3,000,000 are fully paid and 1,500,000 are called up to the extent of 1s. per share) at par, and £2,600,000 5 per cent. debenture stock at 85 per cent. In the previous year the ordinary shares received a total dividend of 10 per cent. and the preference 8 per cent.

**LAGUNAS SYNDICATE.**—Sir Robert Harvey presided over the annual general meeting of the Lagunas Syndicate, Ltd., on December 9. He said that both the companies oficinas were closed during the year under review from July 1, 1919, to June 30, 1920. Yet the trading profit shown was £38,061. Costs of production were unduly high, but personally he thought the high water mark had been passed. Sacks were cheaper, rate of exchange lower and shipping freights reduced. Mentioning the fact that the Americans and Germans had remained outside the Asociacion, he said the offering of their outputs at prices below those fixed by the Asociacion has undoubtedly had a weakening and disturbing effect on the markets. A telegram had been received from the Asociacion de Productores de Salitre, Valparaiso, reporting that an agreement had been arrived at between the directorate and the

German producers, subject to the approval of the members at an extraordinary meeting to be called at once. The main points of the agreement are: That the sales made by the German producers for the current nitrate year are not to be incorporated into the Asociacion's accounts; that the Germans are to be paid a compensation of 3s. 6d. per qtl. for withdrawing from the market up to June 30 next, a fixed quantity of 89,000 tons which they will have available for shipment to that date (although it is provided that if the Asociacion make further sales for the period ending June 30 next the German producers will participate, in which case payment in respect of the aforesaid quantity of 89,000 tons would naturally be reduced), and that all forward sales made by the Germans from June 30, 1921, will be placed against their quotas as to quantities, but not as to prices. Certain modifications of the statutes are called for, but these are not important. Generally speaking, this arrangement may be considered, we think, a satisfactory one.

## Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Melbourne ...	Glassware ... ..	789
Auckland; ...	Soap; dyes; starch ... ..	803
Auckland; ...	Glassware; paints; colours; varnishes	805
Georgetown; ...	Soap ... ..	806
Seville ...	Glassware ... ..	813
Constantinople	Gum tragacanth; copper ... ..	815
Egypt ...	Photographic materials; chemicals, &c. Replies should be marked "Tender for the supply of photographic material," and addressed to The Director (Personnel and Equipment Department), Ministry of the Interior, Cairo, Egypt.	—
Bergen ...	Chemicals; soda; oils ... ..	—
Lima ...	Chemicals; glass; drugs; soap ... ..	823
Trieste ...	Chemical products; mineral and vegetable oils	—
Antwerp ...	Fine chemicals; drugs ... ..	—
Mexico City ...	Fats and greases ... ..	—

## Dyestuffs Bill Through Committee

STANDING Committee B, with Mr. A. Rendall in the chair, discussed on Wednesday the questions relating to provisions as to licenses and the constitution of advisory Committees, in connection with the bill to regulate the importation of dyestuffs.

Mr. Waddington moved to add to Clause 2 the following: For the purpose of advising them with respect to the efficient and economical development of the dye-making industry the Board shall constitute a committee of persons concerned with the trades of the dyemaker, of the dye-user, and of such other persons not directly concerned with such trades as the Board may determine.

Sir R. Horne said the grants under the old scheme had been made for research work. He understood that the committee was anxious to have such a clause inserted in the bill, which would ensure the development of research.

The amendment was agreed to. The motion that Clause 2 as amended stand as part of the bill was agreed to.

A new clause, moved by Major Mackenzie Wood, to the effect that licenses granted under the bill shall not be transferable was accepted by Sir R. Horne and agreed to by the Committee.

The committee stage was concluded and the bill, as amended, was ordered to be reported to the House.

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## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

### London Gazette

#### Partnership Dissolved

TAYLOR, FRED, and NOCHAR, JOHN WILLIAM, colour manufacturers, at 436, Cheetham Hill Road, Manchester, and 18, Booth Street, Manchester, under the style of Woodlands Colour & Chemical Co., by mutual consent, as and from November 5. All debts received and paid by F. Taylor.

#### Bankruptcy Information

GRANTHAM, REGINALD, Rosedale, Severns Avenue, Acomb, Yorks., carrying on business at 66, Blossom Street, York, chemist. December 10.

#### Company Winding Up Voluntarily

WETCARBONIZING, LTD. (in voluntary liquidation). A. P. Ibbott, Liquidator.

### Mortgages and Charges

[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced since such date.]

INESON GIBBS OIL & CHEMICAL CO., LTD., Birmingham. Reg. November 26, £200 debentures, to H. J. Hyde, 18, Doris Road, Sparkhill; general charge. \*Nil. October 4, 1919.

PEACHEY PROCESS CO., LTD., London, W. Reg. December 9, £4,000 mortgage, to Evans Sons Lescher & Webb, Ltd., Liverpool; charged on land and messuage, &c., at Willesden.

VICTORIA CHEMICAL WORKS, LTD., Stratford, E. Reg. December 3, £4,500 debentures, to W. Waugh, 4, Lloyd's Avenue, E.C., chemical merchant; general charge.

### County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

TRISTRAIL, J. P., The Pharmacy, Porthleven, chemist. £36 8s. 9d. November 4.

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Steel Wire Belts for Hoists, Elevators, Conveyors, etc.  
Enquiries with particulars promptly attended to. (2)

WALTON, W., West Ham Pharmacy, 61, West Ham Lane, Stratford, chemist. £13 7s. 8d. November 2.

SAXBY, A. C., 397, High Street, Cheltenham, chemist. £10 19s. November 4.

TRAYNOR, J., 7, Waine Street, Parr, chemical manufacturer. £13 10s. November 5.

### The New Motor Freight Exchange

As already announced in these columns, the *Transport World*, the new weekly to be published by Benn Brothers, Ltd., on January 5, will embody a novel journalistic feature to be known as the Motor Freight Exchange. We have also indicated that special facilities would be given to our readers for the use of this new aid to business, and we are now in a position to give more exact details of those facilities. The Motor Freight Exchange will be divided into two main parts, the one giving information as to freight, awaiting transport, and the other announcing transport facilities available for freight. A manufacturer having goods to send from, say, Nottingham to Bradford, will announce that fact in the previous week's *Transport World* in order that motor owners whose lorries may be on that road on the date stated, may place themselves at the service of the manufacturer. Conversely, a motor transport contractor, or a private lorry owner who is sending a load from Liverpool to Carlisle and is faced with the prospect of an empty journey from Carlisle to Liverpool will give particulars of the facilities which he can offer to a Carlisle merchant in order that he may find a load for his return empty journey. All this information will be given in the most succinct and briefest form. A single line will in most cases suffice to name the starting point and the destination, the amount of freight or the capacity of the lorry the date of the projected journey and the name, telegraphic address, and telephone number of the advertiser. By the publication of large masses of information of this description, a new prospect opens up both to lorry owners and to freight users. The publisher of the *Transport World* has prepared slip forms for the convenience of advertisers under both those heads, and a supply of these will be gladly forwarded to any who may desire to avail themselves of the facilities offered.

This brings us to the special facilities which we have mentioned as available to readers of THE CHEMICAL AGE. For the month of January only, Benn Brothers, Ltd., are prepared to publish in the *Transport World* information under either of the above heads, free of charge, so that every opportunity may be given to our readers of availing themselves of the new service and testing for themselves its capabilities and usefulness. In order to take advantage of this offer, readers should write to the Publisher, the *Transport World*, 8, Bouverie Street, E.C.4, stating that they are subscribers to our Journal, and asking for a supply of the necessary free form. The first issue of the *Transport World* and *Motor Freight Exchange* will be published on January 5, and free advertisements asking for freight facilities or motor loads should have reference to the week beginning January 7.

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